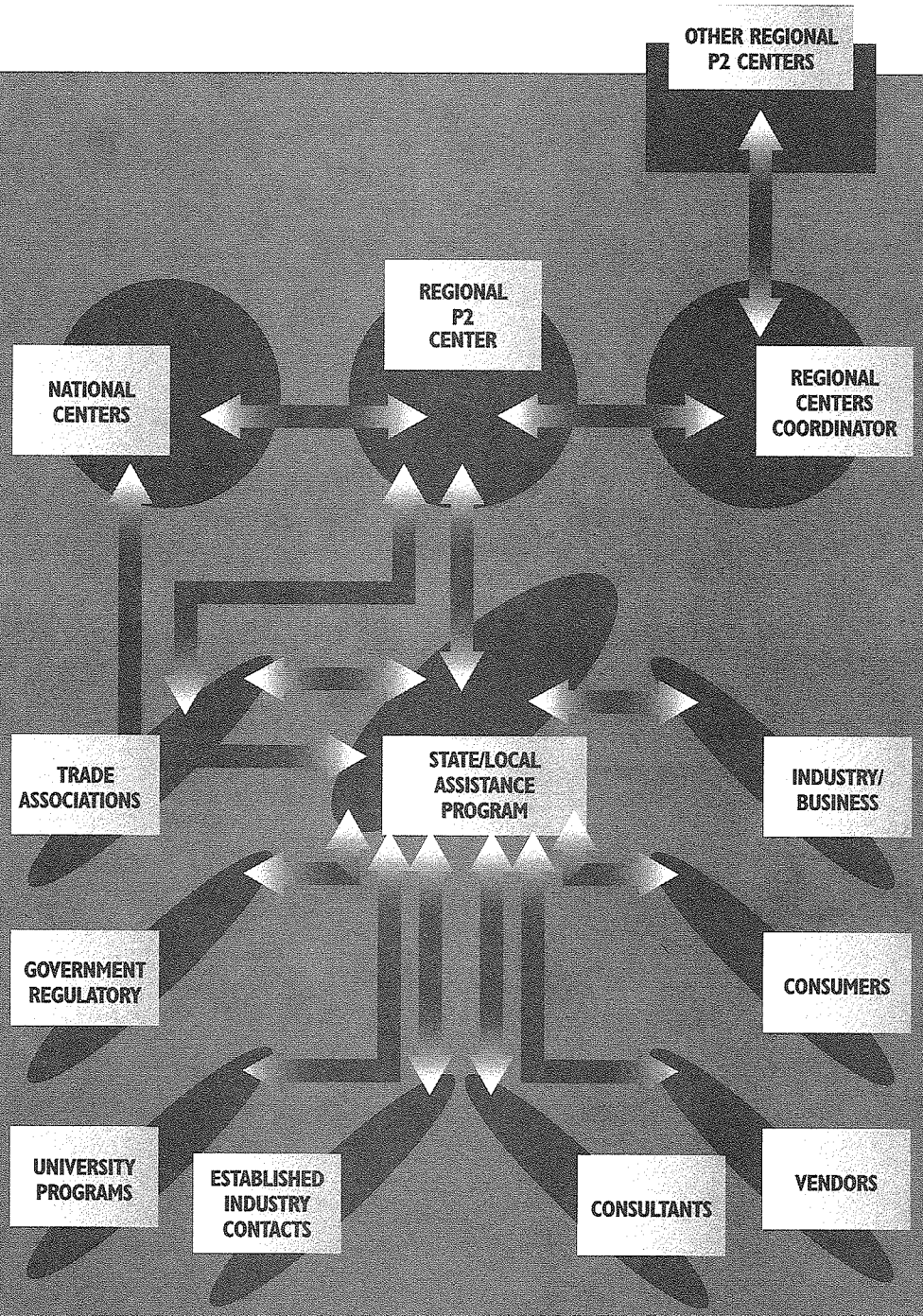
# *Recommendations for a National P2 Information Network*



# Recommendations for a National P2 Information Network

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# Section 1. Introduction

Today there are a multitude of federal, regional, state and local programs providing assistance to small business. Many of these agencies have embraced pollution prevention as the preferred environmental protection strategy and are integrating it into the services they provide to industry. However, to remain effective in providing their services these programs require reliable and authoritative sources of information about pollution prevention, waste reduction, cleaner production technologies, design for the environment, and environmentally sustainable practices.

Information is critical to induce businesses to undertake pollution prevention projects. Companies need to understand the various P2 alternatives and their ramifications prior to making any changes in their facilities. In an attempt to encourage industry to implement pollution prevention, state and local environmental agencies established P2 assistance programs. These programs provide companies with technical reports, case studies, on-site assistance, referrals to industry experts, newsletters, and vendor information. P2 assistance programs have found that obtaining current and reliable information on P2 strategies is challenging. When they can't find information they need, local P2 programs often develop it themselves. Often they end up producing material that programs in other parts of the country have already published.

Pollution prevention programs have long recognized the value of a national network that links P2 information sources with the needs of local assistance providers. In 1995 the National Pollution Prevention Roundtable (NPPR) published *Organizing a National Pollution Prevention Network*, which outlined some of the issues that surround the dissemination of P2 information. The report recommended a structure involving regional centers that would be linked together to create a national network. EPA piloted the development and coordination of two regional centers. These regional centers were responsible for working directly with and coordinating among the state and local pollution prevention programs, establishing regional priorities and serving as a point of contact for the regions. This structure was proposed so that P2 information:

- Is maintained at the local level;
- Is made readily accessible and easy to search;
- Is updated and of high-quality;
- Identifies primary/expert sources of information;
- Is integrated into a sector- and process-specific synthesized format; and
- Addresses the needs of local and state agencies.

In February 1997 the NPPR Information and Technology Transfer Workgroup issued a report titled "*Establishing a National Pollution Prevention Network*", which reaffirmed the structure proposed in the 1995 report and proposed a cost estimate for network operations. This report also provided an overall vision for a national P2 information network and an estimated scope of work for network operations.

"*Recommendations for a National Information Network*" builds on these reports and provides detailed information on (1) the lessons learned from two regional centers, (2) the challenges facing the existing network, (3) the existing infrastructure for a national P2 information network, (4) the recommendations for needed improvements and support and (5) the recommendations for the national P2 information network. The purpose of this report is to detail the experiences of two regional centers in their efforts to develop interstate and inter-regional programs and present recommendations for future efforts in this area.

# Section 2. Model Regional P2 Information Centers

In order to learn about the challenges involved in facilitating regional and inter-regional P2 information coordination, EPA funded a pilot project to develop communication and joint projects involving two regional centers. This section reports on the results of this cooperative agreement.

In October of 1994, EPA provided funding to the Northeast Waste Management Officials' Association (NEWMOA) to undertake a three-year pilot project to establish a model program for interstate and inter-regional cooperation on pollution prevention (P2) information sharing in the Northeast and Great Lakes regions. In the Northeast region, NEWMOA funded the efforts of the Northeast Pollution Prevention (NE P2) Roundtable. In the Great Lakes, NEWMOA funded the Illinois Waste Management and Research Center (WMRC) and the University of Wisconsin Solid and Hazardous Waste Education Center (SHWEC) to support the Great Lakes Regional P2 Roundtable (GLRPPR). The goal of the project was to enhance information sharing between P2 programs in these regions. This project piloted methods of facilitating coordination and information sharing between P2 regional centers. The objectives included:

- Developing models for regional P2 information centers
- Supporting state and local efforts to implement strategies for effectively disseminating P2 material
- Piloting methods for developing pollution prevention information manuals on targeted industries for assistance providers
- Investigating and demonstrating various methods for disseminating information in both hard copy and electronic format
- Training state and local pollution prevention staff in using the various electronic vehicles for accessing information packets and for searching databases
- Creating methods of sharing information within and between the Northeast and Great Lakes Regions
- Evaluating the effectiveness of the pilot in developing inter-regional coordination

When this project began in 1994, there were no compliance assistance centers, seven Manufacturing Extension Programs (MEPs), and no published reports from the NPPR. However, in the three years since this project began EPA established national compliance assistance centers, the Department of Commerce established 72 additional NIST MEP programs, and some Small Business Development Centers (SBDC) began to add environmental assistance to their list of services. This expansion has only increased the need for coordination, not only among state P2 programs, but throughout the entire realm of programs providing assistance to business. In addition, it has increased the need to provide training to these new programs on P2 topics such as appropriate technologies, implementation trade-offs, regulatory roadblocks and measurements. In order to bring these programs up to speed and to reduce redundant efforts, a national network to coordinate these activities is needed.

The two pilot regions for this project were chosen because of the existence of organizations that were already concentrating on regional coordination. In the Northeast, there is a 50-year history of inter-state cooperation on environmental issues, including the establishment of several inter-state environmental associations (based upon the air, water, and waste programs). In the Great Lakes region, the Great Lakes Initiative of the 1980s created a forum that brought states together to reach consensus on policy issues. Because of the nature of the group, member organizations spend considerable time on GLRPPR activities, which is balanced by the amount of information that they

gain. There is increasing support within the regions as regional activities mature and provide more tools to its members.

The history of cooperation in these regions provided an environment that fostered the development of P2 roundtables. Managers within environmental departments recognized the benefits associated with regional programs and were willing to devote staff time to these efforts. In both cases, regional roundtables had been facilitating and coordinating multi-state information projects for over eight years. By 1994, the regional roundtables had evolved to a point where they were ready to further develop their regional information centers. This created a solid foundation for the pilot project. Had the existing regional structures not been in place, the pilot project would not have been as successful.

The elements that were critical to development of these centers included (1) the states had "bought-in" to the concept of a regional center and created a structure for it; (2) the members shared a common vision of what role the center would play; and (3) the centers had the necessary organizational structures in place to be able to understand their member's needs. The two regions have found that these components have been critical to the successful development of their regional information centers.

The following sections describe the two models tested in the pilot project and some insights on the advantages and disadvantages of each one.

## Independent Association - NEWMOA

The Northeast Waste Management Officials' Association is a non-profit, interstate association whose major function is program coordination and information sharing. Their clients are the member states of Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont. NEWMOA's main governing body is a board of directors comprised of state waste management and pollution prevention program directors. This management structure reinforces the group's focus on member states' priorities. A benefit of this type of organization is that there is a clear structure for decision-making and a low-level of bureaucracy.

Funding is the main challenge for this type of organization. There are no dedicated funds for interstate associations and while states do contribute dues and other funds, they will never be able to provide enough support to sustain a strong regional program. NEWMOA and other interstate organizations devote a substantial amount of time to obtaining project-specific funds that are awarded through competitive grants. While this forces the associations to continually develop innovative programs and projects for their members, it also limits the amount of time they can spend on sustaining core activities. Core activities, such as information sharing and meetings, are the underpinnings for regional cooperation.

## State Agency - Great Lakes Regional Pollution Prevention Roundtable

The Great Lakes Regional Pollution Prevention Roundtable (GLRPPR) provides a mechanism for information exchange among the state technical assistance providers in Great Lakes states and the Canadian province of Ontario. It began and continues as a voluntary organization. There are no membership dues or requirements other than an interest in fostering P2 in the region. Originally, this group started with informal meetings and little structure. However, it quickly became evident, as the number of participants at the meetings grew, that a structure with a

coordinator was necessary for the regional interactions to continue. With support from EPA Region 5 and the Great Lakes Protection Fund, GLRPPR began more formal operations in 1994. Funding from the grant program Pollution Prevention Incentives for States became a source for GLRPPR activities, such as coordinating meetings, publishing a regional newsletter, creating a web-site, and managing databases and list-servers. In this region the location of the coordinating body was determined by RFP with WMRC chosen as the host agency.

As a state agency, WMRC can qualify for EPA funding to operate the GLRPPR services. WMRC is also affiliated with the University of Illinois and qualifies for other funding opportunities that may become important for the further development of specific information resources. By placing the group within an existing agency, there is existing infrastructures such as administrative and financial systems, which an independent organization may not have.

There are disadvantages to GLRPPR's open membership structure such as limitations on policy related activities. The current consensus decision making process has been effective thus far, but as the group grows a more formal decision making process may be necessary. Communication between regional meetings has been limited, and continues to be a challenge. As people return to their organizations and jobs getting staff to devote time to work on regional issues/projects can be difficult. This has been partially resolved through the use of electronic communication via listservers. With WMRC as host, providing a one for one match for more than half of the funding, the state of Illinois is making a very large commitment to the GLRPPR and P2. Currently, the state is willing to provide a great deal of support, but the level of support could change in the future.

As stated above, GLRPPR and the NE P2 Roundtable tested methods for improving inter-state and inter-region information sharing. The following section outlines the methods piloted in the project and a preliminary evaluation of them.

## Methods Tested

### Regional Information Committees

Both NEWMOA and the GLRPPR have information sharing committees as a subset of their general regional activities. Initially, the main purpose of these groups was to identify the information needs of the Roundtable members. Their membership came from government programs. Today, representation on their committees' includes individuals working in education, trade associations, environmental groups, local governments, not-for-profit groups, regional organizations, businesses, consultants, and vendors. Identifying information needs was and remains a vital part of their information committees' mission, however, as the needs of the regional group changes so does the mission. Therefore, the mission has expanded to include locating, collecting and developing of information resources, as well as testing innovative information technologies.

Initially P2 programs simply wanted access to all available information. This has been replaced by focusing on the quality of the information that is disseminated. This means the committees now focus on the types of materials that are collected and distributed, as well as issues such as standardizing data formats, developing new resources, ensuring the availability of information and creating effective distribution mechanisms.

### Regional Strategic Plan

NEWMOA's P2 Information Dissemination Committee (P2ID Committee) drafted a three-year strategic plan in 1995, which established a short- and long-term roadmap for the region and set priorities for the regional information center. The strategic plan also provided a common vision and

goals for all the participating programs and guided the selection of specific projects. These included the development of synthesized information manuals on the metal finishing and metal coatings sectors, the creation of training and the publication of a guide on accessing pollution prevention information electronically and the development of the P2INFO, P2Experts and P2Trainer databases (see Appendix B for more information on these databases). In addition, the NE P2 Roundtable secured funding to support two additional model projects: development of electronic information resources for printers in the Northeast, and initiation of outreach activities and development of materials for auto repair facilities in environmental justice communities.

## Industry Specific Synthesized Information Manuals

Various surveys of technical assistance providers have identified the need for specific, synthesized and current pollution prevention information that is packaged specifically for them (Tompson, 1994). These surveys have found that there is a large amount of industry specific information, however, the material rarely covers the entire process to the level of detail which technical assistance providers require. In addition, the information has rarely undergone technical review by industry experts. The purpose of the new manuals was to address the demand for synthesized, peer-reviewed information on a specific industrial sector.

Each regional center developed two manuals. These manuals focus on metal finishing, printing, metal coating and foundries. They cover technical information on:

- Industry sector history, economics and structure
- Assessment methods
- Pollution prevention options and technologies
- Case studies
- Resources to aid assistance providers

NEWMOA and WMRC staff developed the manuals by reviewing all of the currently available P2 information on the industry or process, including vendors' information, trade and research journals, government publications and conference proceedings. This information was synthesized into a single document and sent out for review by a panel of national experts. The expert panel included technical assistance providers, vendors, trade association representatives, and industry staff. These experts provided critical comments and direction for each packet.

Production of the information packets has been more challenging and time consuming than was originally anticipated. During their production, the two centers relied on each other for new material, reviews of draft documents, and coordination of the printing and distribution of the final product. While each center handled incorporation of the reviewer's comments, the final editing, formatting, and general production of the camera-ready packets was a joint effort. The high quality of the final documents is an indication of the value of that interaction. Initial responses to the first packets have been overwhelmingly positive. Assistance programs have reported to the centers that more of these types of documents are needed and have requested production of additional packets. A more formal evaluation of the packets is currently underway. The centers will use the comments received during this process to update and improve the manuals.

The centers have also used the packets to leverage other projects, including the development of training for inspectors and permit writers on P2 opportunities in metal finishing and the development of a CD-ROM information tool for printers. Although the primary audience for these packets is P2 assistance providers, a variety of other groups have found them to be useful, including

state environmental regulatory programs, SBDCs, NIST centers, local government agencies, and industry. These groups have ordered the documents, and report that they are a valuable tool.

## Training

Environmental professionals face a challenging array of changes--technical, organizational and political. They must demonstrate not just technical competence but an ability to continuously update and broaden their technical skills and information resources. The regional centers have developed two new training programs to help P2 assistance providers improve their ability to access information and their understanding of technical information.

The NE P2 Roundtable developed a workshop on accessing P2 information electronically, which was presented to both regional groups. The results of the workshop evaluations were overwhelmingly enthusiastic. The training will be repeated again in the Northeast later this year. The NE P2 Roundtable also developed a companion document to support the training.

The second type of training is sector-specific training. This training was designed to reinforce the information in the manuals. The NE P2 Roundtable developed a workshop on metal finishing in conjunction with the Massachusetts Department of Environmental Protection, and the Toxics Use Reduction Institute, was presented in June of 1997. Technical training is critical to maintaining the expertise of assistance providers, who often deal with a variety of industrial sectors and processes.

## Databases

To improve access to P2 information, many regions have developed databases, including bibliographic databases that catalogue technical documents held in P2 libraries and vendor databases that catalogue vendors of P2 equipment. The NE P2 Roundtable and the GLRPPR have updated their regional databases under the pilot project.

WMRC and the NE P2 Roundtable found database compatibility to be a significant issue for updating existing databases and creating new ones. Both regions have been managing and creating regional databases that are built by combining various local, state and regional databases. Aggregating databases, both intra- and inter-regionally, requires information format that are easily merged. For the major contributors to the Great Lakes Clearinghouse, SHWEC provided a data collection software to help them maintain compatibility. SHWEC and the other Great Lakes programs developed a standard format, and they asked all contributors to provide their records using that format and to include only items readily available from them or a local library.

In the Northeast a similar approach was taken, although software was not provided to member organizations. This approach was successful at the regional level, but issues arose when the NE P2 Roundtable and WMRC tried to combine information for a national database. While the Northeast and Great Lakes database structures were similar, they were not entirely compatible. Other regions had developed entirely different systems on different software, and these were not at all compatible with the Northeast or Great Lakes databases. This led to a time-consuming task of revising the databases so that they could be merged. Efforts are still underway to develop a structure that is acceptable to both regional groups. Currently, WMRC and Region 9 are leading the efforts of the Information Workgroup of the NPPR to develop a national standard for bibliographic databases.

The NE P2 Roundtable's strategic plan identified two new areas where information was not being catalogued, private sector P2 expertise and professional P2 training. This led to the creation of the P2Experts and P2Trainer databases, both of which were developed by NE P2 Roundtable staff.

### Transferring Regional Efforts to Emerging Centers

During the second year of the project, programs in EPA Regions 6 and 9 formed regional roundtables that were interested in developing information system activities. EPA asked the three groups involved in the pilot project to meet with and assist Regions 6 and 9 contacts with organizing their roundtables. Representatives from the Great Lakes and the Northeast attended meetings in these regions and provided input and guidance to the emerging centers. In particular, NEWMOA and WMRC provided training and assistance during the third year of the project on:

- Regional strategic planning
- Pollution prevention information resources
- Database development
- Regional Internet-based communication systems

The initial efforts to assist the emerging centers took place through conference calls. During these calls, GLRPPR and NE P2 Roundtable staff provided suggestions on developing meeting agendas and advice on other regional coordination to staff in Region 6 and 9. Then representatives from both centers participated in their regional meetings. NE P2 Roundtable staff also facilitated the Region 6 strategic planning meeting that took place in March 1997.

### Inter-Regional Coordination

Over the past two years the GLRPPR and the NE P2 Roundtable coordinated their activities on the pilot project through a variety of mechanisms, including conference calls, face-to-face meetings and e-mail. Participants in the project set-up an Inter-Regional Committee that included participants from the three programs, as well as representatives from member states on an "as-needed" basis. The primary inter-regional coordination communication vehicles was periodic conference calls. These calls provided the group with ample opportunity to work together on several tasks, including developing inter-regional workplans, merging regional databases, writing and submitting grant proposals and reports, developing a case study format and creating synthesized information packets. These calls have also allowed the two centers to provide suggestions and ideas to each other. The groups also met at semi-annual National Pollution Prevention Roundtable Conferences. At the NPPR conferences the groups met with other center representatives to discuss efforts on this pilot project and coordinate with other pollution prevention information activities.

## Conclusions

As the three-year pilot project progressed, the two regional centers learned more about each other and built closer relationships. The two regional centers developed a greater sense of trust, and the groups were able to leverage each other's efforts. For instance, the GLRPPR had several planning documents that were available but not updated. NE P2 Roundtable's strategic plan helped WMRC to update those documents for the GLRPPR. As stated above, Internet training, developed by the NE P2 Roundtable, was provided to members of the GLRPPR and materials from that training have been used in the Great Lakes for additional regional workshops. WMRC and the NE P2 Roundtable continue to use the electronic information resources available from each other, as well as those from other regional groups. The interest in and the ability to leverage resources across regional centers has not happened instantaneously; it took time to develop the close relationship

between the two regional groups. The project has resulted in a growing respect by each center for the other's skills and knowledge.

Both regions have learned a great deal as participants in this pilot study. The relationships that developed between the two regions would not be as beneficial or as strong had it not been for this project. This project has broadened the perspective of the regional centers' focus by formally bringing them together, not just to help each other grow, but to learn from each other's efforts and experience.

# Section 3. Challenges Facing the Existing P2 Information Network

Given the wide array of assistance service providers and the tools that have been developed for them, one might think that there is already an adequate national P2 information network in place. The main issues surrounding the development of a national P2 information network include:

- Fragmentation of P2 programs
- Lack of funding
- Inconsistent access to and quality of P2 information

These issues are discussed below.

## Fragmentation and Redundancy

Currently, P2 programs coordinate functions through a loosely connected group of state and local assistance providers, researchers, national centers, regional networks and sector centers. These programs communicate through various regional roundtables and national conferences, primarily the semi-annual National Pollution Prevention Roundtable conferences. The national coordination efforts thus far have not been well organized, have no system for priority setting and suffer from inconsistent communications. As a result the local, state, regional and national programs have not been able to effectively coordinate their activities. This has led to the various groups taking on similar projects and missing opportunities to link projects that could leverage the limited resources EPA and others have devoted to P2.

At the national level, the funding sources for P2 and other assistance activities are fragmented over several diverse agencies, including the Environmental Protection Agency, the Department of Energy, the Department of Defense and the Department of Commerce. Generally, these federal agencies do not coordinate their funding priorities and tend to have different missions and objectives. These differences can create redundant programs and even rivalries between agencies at the regional, state and local levels. In addition, federal programs often establish priorities that are not consistent with those of local agencies that are trying to address their priorities while leveraging national support.

## Funding

Funding for the national P2 information network is a major issue. To date, national support for P2 programs has been project-focused. Strong regional centers have developed as a result of states and EPA regional offices directing resources to them. However, the lack of nationally coordinated funding for regional centers has resulted in a patchwork of regional efforts with some regions having little or no underlying regional coordination while others have a great deal of regional coordination. Consequently, many of the existing regional centers focus a large amount of effort on obtaining funding. This detracts from important information projects and basic coordination activities. In 1997, EPA's Office of Pollution Prevention and Toxics issued a RFP to support regional centers and national coordination. Prior to this RFP, EPA had provided limited funds to support regional and national coordination.

## Quality and Accessibility

Many different agencies develop, collect, organize and distribute pollution prevention information through a variety of mechanisms. Most of the P2 information collection and dissemination has been done by local, state and regional P2 programs. In recent years, the number

and type of programs involved in these activities has grown exponentially. When EPA began the pilot program in 1994 only a handful of NIST Manufacturing Extension Partnership (MEP) and Small Business Development Centers (SBDCs) programs were involved in environmental issues. EPA headquarters had invested in national programs, such as Enviro$en$e, the Pollution Prevention Information Center (PPIC), and more recently, sector-specific compliance assistance centers. Other types of programs are also entering the P2 arena, including state small business assistance programs (SBAPs), SBDCs and MEP programs. A description of the resources and missions of these organizations is provided in Appendix A.

While these federal and state agencies often share common P2 goals, they serve various types of clients and use different methods to disseminate P2 information. They may also provide assistance within a specific region, or industrial sector, or provide assistance outside the context of an environmental program (for instance the SBDCs primary function is to provide financial planning assistance). The vehicles that these agencies use to collect and distribute information are as varied as the clients that they serve. Therefore, each of these various programs has distinct information needs. To address this issue most state and some regional P2 programs established clearinghouses of hard copy information (e.g., books, reports, journals, articles, and case studies). These include clearinghouses, databases, web-sites, list-servers and regional/national meetings.

Acceptance and growing use of computer resources, such as electronic mail and the World Wide Web (WWW), has brought about a steady increase in the electronic distribution of P2 information. For instance, several programs have uploaded their databases onto the Internet, allowing database searching and document retrieval from one's desk. Listservers have been developed by a variety of programs to transfer P2 information via e-mail. Web-sites have allowed people to access full-text documents instantaneously. Currently, utilization of these resources varies widely. Nevertheless, GLRPPR and the NE P2 Roundtable believe that as Internet access grows it will become an increasingly powerful information transfer tool. Even with all these electronic communication systems in place, assistance providers continue to need to hold periodic meetings and conference calls to share information, materials and databases and to coordinate regional projects, to get to know each other, and to collaborate on information networking projects.

For state and local P2 assistance programs, ensuring widespread availability and quick accessibility to accurate and complete pollution prevention, technical information is vital to their mission. However, many P2 topics do not have detailed, high quality information, and currently no method exists to identify information gaps. For topics where adequate information does exist, often it has not been consolidated, indexed, or catalogued. National pollution prevention information sources that EPA developed, such as the Enviro$en$e web-site and the OECA sector compliance assistance centers, have filled some of these gaps but by no means all of them. As a result, the current system often results in the dissemination of out-of-date or incomplete information.

In the past, P2 assistance providers focused on gathering large quantities of material or citations. However, in recent years they have recognized the value of identifying a small number of high quality materials that address the specific questions and concerns of their clients. There are several new projects underway to discern and identify the small number of high quality materials that address specific questions and client needs, but this is by no means a comprehensive effort. For a national information network to be effective, it must develop a mechanism to increase the ability of state and local programs to identify who is developing what information resources and when they will be available. Resources are needed to improve the quality, accuracy and timeliness of the information collections, and to develop areas where information is lacking.

## Conclusion

In this time of limited funding, a coordinated national P2 information network could help state and local programs direct their resources to those areas of greatest need and enable them to effectively build on the projects of others. However, for state, regional and national entities to devote time and resources to the network, there must be a commitment at the highest levels to addressing the issues of fragmentation, long-term funding, national coordination and information quality.

# Section 4. Recommendations for a National P2 Information Network

Creating a national pollution prevention information network will require a long-term commitment from both the funding agencies and the state and local assistance providers. Given the wide array of assistance providers and their different needs and missions, linking the network together in a cohesive manner will be a difficult but worthwhile effort. Successfully meeting this challenge could mean the creation of a system, which allows pollution prevention assistance programs to effectively and efficiently provide accurate and current P2 information to their clients, access new information, implement new strategic initiatives and leverage the efforts of other assistance programs.

Many questions arise as federal, state, and local agencies move forward on developing a national P2 information network, including:

- What is the best method for delivering this service?
- Who should be involved in the network?
- How should the network help coordinate between EPA, DOD, DOE and other federal players in the P2 field?
- How should the government, public and industry evaluate the value of its investment in the P2 information infrastructure?

This section attempts to answer some of these questions and presents recommendations for creating a national P2 information network. This section begins by proposing a mission and goals for the national P2 information network; followed by recommendations for the overall structure of the network and the roles of each group. Following is a discussion of the various components of the information network and potential models for national coordination. The authors also include models for network evaluation. Recommendations presented in the report are based on the experience of the authors in developing regional and inter-regional networks. The authors have also drawn upon the expertise of over 40 individuals, including representatives from EPA, NIST, SBDCs, DOE, DOD, state and local technical assistance programs, trade associations and industry. These representatives shared their thoughts and concerns during meetings and interviews held by the authors of this report.

## Mission & Goals of the Network

As outlined in the NPPR's 1995 Blue Ribbon Panel Report (Kerr et al) on establishing a national network, the goals of the pollution prevention information network depend upon three considerations:

- Who are the primary users of the network?
- What are the needs and concerns of this audience?
- How will the information ultimately serve them?

The participants in a number of NPPR Information and Technology Transfer Workgroup meetings[1] concluded that while agriculture, business, industry and other private organizations are the

[1] These meetings include the NPPR Information Technology Transfer workgroup meetings held at Coolfont, West Virginia in November 1996 and at Denver, Colorado in April 1997, as well as the Blue Ribbon meetings held for the 1995 NPPR Information Network report.

primary audience for pollution prevention assistance, the focus for the national pollution prevention information network should be federal, state, local, tribal, non-profit and university P2 assistance programs. Businesses, vendors and consultants that have the capacity for electronic information transfer and the resources to effectively use source reduction information without the help of an assistance provider also could utilize the network. The meeting participants asserted that better and easier access to high quality P2 information is essential to technical assistance programs. The national P2 information network should work to serve this need by improving access to and the quality of pollution prevention information available to the assistance programs listed above. The network should be designed so that P2 assistance providers are empowered to provide better service in assisting businesses through increased access to the most-up-to-date and highest quality P2 technical information. This should improve industry's ability to identify the P2 approaches and technologies that will enable them to become more productive and less polluting. A secondary function of the network should be to increase the distribution of information developed by these programs without replacing or duplicating the services of local programs.

Another goal of the network should be targeting P2 research and information projects to avoid redundant efforts and fill gaps. A relatively small amount of federal funding has been directed toward pollution prevention, and EPA and the states can ill-afford to devote these resources to redundant efforts. Through the national P2 information network, pollution prevention programs can learn of and build on projects that other programs have conducted, thereby increasing the effectiveness of new P2 projects. The network should also help assistance programs identify project partners, locate existing resources and provide timely information to business. The network can also identify areas where information is lacking and assist in identifying programs with the capability to fill those gaps.

A network that links a wide range of pollution prevention information and technical and business assistance would create a national resource that is greater than the sum of its parts. Such a national resource is essential to the wide-spread adoption of pollution prevention technologies and practices by agriculture, consumers, business and industry. This network is also critical to the efforts of the United States in developing a sustainable economy.

## Recommended Structure of the Network

A theme that has been echoed repeatedly by representatives of assistance programs during the many meetings was that the P2 Information Network should focus on improving the capabilities of the local P2 assistance providers. Keys in achieving this include:

- The design and operation of the information network should provide state and local participants with a major role in defining their own needs and opportunities for coordination;
- The network should be able to respond to the ever-changing demands of the assistance programs;
- The network should provide an appropriate range of services to support a broad-based group of programs with diverse capabilities, needs and resources;
- The network should be built upon existing resources so that it can provide experienced service and increase the capacity of existing and emerging organizations; and

- The network should provide a variety of vehicles for sharing and accessing expertise, experience, and information.

The authors of the previous NPPR reports on the national P2 information network recommended structuring the network so that it is responsive to the needs of grassroots organizations, primarily through the use of regional centers. The simplest way to envision this structure is as a pyramid. At the base of the P2 information network would be the direct providers of P2 information to industry. These programs could include state and local P2 assistance programs, NIST MEPs, SBAPs, and SBDCs. The next layer would comprise the regional centers. These centers would focus on coordinating and developing information for their region. They would also help provide input and direction for national initiatives, such as the OECA compliance assistance centers. At the top of the pyramid would be a national coordinating group. This national coordinator would serve as a focal point for coordination of all P2 information activities. To use the human body as an analogy for the network, the direct assistance programs are the arms, legs and heart of the network getting the information out to industry. The regional centers are the nervous system that keeps the information flowing to and from the member states and out to the other regional centers in the network. National coordination could be thought of as the muscular/skeletal system holding all the pieces together and keeping the structure moving. The following sub-sections describe the roles of each group within the network and makes recommendations where additional infrastructure is needed.

## Regional Centers

The regional centers should be responsible for working directly with the state and local pollution prevention programs to facilitate interstate coordination and cooperation, establish regional priorities, and serve as another point of contact for regional activities. Regional centers can help with developing, collecting, and providing quality information to better serve the state and local programs. Regional center staff should identify regional information needs, handle requests from P2 providers, and locate, evaluate and develop information for their constituents. Specifically, the regional centers can:

- Oversee and coordinate resources within the region
- Provide standard formats for written and electronic resources
- Provide quality control for information projects
- Provide electronic search capabilities and expertise
- Recruit, market, train and mentor new programs
- Maintain, develop and/or distribute resources including technical documents, clearinghouses, databases, and web-sites as requested by the member states
- Develop and/or provide training for assistance staff on topics such as developing databases, understanding industrial or process information, or performing financial assessments

The large numbers and diversity of assistance programs around the country makes the undertaking of these tasks by a single entity at the national level daunting and probably unsuccessful (Kerr et al, 1995). Past efforts at single national coordination points have proven this point. However, the Northeast/Great Lakes pilot project has shown that achieving these goals at a regional level is feasible. Regional centers can help improve the efficiency and effectiveness of state and local programs. Regional centers should also work together on the national level in a cohesive and cooperative effort to leverage the efforts of all the programs, and minimize duplication of effort.

## Developing A Regional Information Center

As stated above, the EPA-funded pilot project helped the NE P2 Roundtable and GLRPPR develop a system to increase information sharing between pollution prevention programs in their respective regions and improve the quality of the available information. The EPA cooperative agreement enabled the NE P2 Roundtable and the GLRPPR to hire staff whose jobs were solely dedicated to coordinating and implementing regional information projects. These staff people were able to identify and address many of the issues that arose in developing regional P2 information centers. The following sections describe these challenges.

## Regional Structure

Member support for the regional center is its mainstay. Without financial and staff support or "buy-in" from participating groups, the centers would cease to be viable. In order to facilitate active and ongoing participation of a regional information center, there should be a regional forum in place that has a clear organizational structure for setting priorities and making decisions. The structure should also define membership and provide ample opportunities for members to evaluate the center's activities. The regional center must value the input of all of its members. Likewise, participating programs must experience a "return on their investment" of time and resources in regional projects.

The GLRPPR and the NE P2 Roundtable have focused considerable effort on creating these structures and procedures (see previous section for more information on the NEWMOA and GLRPPR structure). As a result, the members have been willing to share ideas openly and cooperate on numerous projects. The two regional entities have developed different structures and membership for their regional information centers. The NE P2 Roundtable and GLRPPR represent two models for regional P2 information centers. Hybrids of these two models or entirely different structures can and do exist (see Appendix A for more information on other regional center structures).

## Function of the Regional Center

Regional centers need to establish a vision to provide focus and cohesion for the group. The vision statement should describe the mission of the center, the role of the regional center and the short and long-term programs it will undertake to achieve its mission. The members should define the centers' services, clients, participants and funding sources. Establishing a process among members for defining and re-evaluating a center's mission should help create a center that is supported by and is responsive to the needs and priorities of its membership.

## Role of the Regional Coordinator

To succeed, the regional centers require a main point of contact whose primary responsibility is managing it. Issues can arise when regional coordination is not someone's primary job function, including competing priorities, difficulty in assessing performance, and unresponsiveness to members. The effectiveness of the regional center can also depend on the choice of a regional coordinator. The regional coordinator should possess facilitation skills, knowledge of different information delivery vehicles, knowledge of pollution prevention, and an understanding of the needs and functions of the clients. The regional coordinator should be constantly aware that their job is to support and coordinate the efforts of the state and local client programs. This requires that the regional coordinator keep members involved and informed while not requiring too much of their time. The regional coordinator must also keep on top of the constantly changing priorities of the states and the varying resources that each state can provide.

## Methods for Coordinating Activities

There are a variety of different tools that regional coordinators can use to stay in touch with a center's members. In the pilot project both regional centers used a variety of information exchange mechanisms, including:

**Meetings** - Routine regional meetings remain important opportunities, not only for exchange of information about all activities in the region, but to network and identify points of common interest that can be enhanced through joint efforts, which compliment and build on rather than duplicate projects.

**Conference Calls** - Conference calls allow the group to meet more often to discuss specific issues and maintain contact between face-to-face meetings.

**Newsletters** - Newsletters offer concrete examples of successful projects and provide an opportunity for the contributors to highlight meetings, new projects and reports, and for subscribers in other regions to learn about regional activities and contacts.

**Listservers** - Regional centers can use listservers to answer questions and find resources quickly. This type of immediate response to a specific problem is strongly supported and desired by the state and local P2 programs. For example, GLRPPR workgroups use listservers to continue the discussions begun at annual meetings, allowing regional issues to be addressed by the group more quickly and easily.

**Web-sites** - Regional web-pages offer a valuable opportunity for states to combine resources to develop web-sites that can facilitate the exchange of technical information and regional coordination. Several regional centers have already developed sites to provide technical information and several other regional centers will be building them in the future.

Using these tools, regional entities can maintain contact with a large number of organizations effectively and efficiently. Face-to-face meetings are critical because they allow for an informal networking that is difficult to achieve through other methods. In-between meetings, conference calls and listservers have proven to be efficient and effective methods to continue discussions. As more and more organizations are connected to the Internet, web-sites will likely improve coordination and dissemination of P2 information.

The GLRPPR and the NE P2 Roundtable's assistance to the emerging regional centers in EPA Regions 6 and 9 have reinforced their belief that it takes a great deal of time and effort to build the necessary underlying structures and relationships described above. Often, new centers rush to produce tools and products and do not focus on developing a shared vision, policies, and procedures. Focusing on specific projects can bring a group together for a short period of time, but it will not create the long-term commitment and support required to sustain a regional P2 information center. Emerging centers often underestimate the time required to build regional entities. Building a regional P2 information network is an evolutionary process. Rushing to create a center without comprehending the needs of the members can be time-consuming and expensive. Once the needs of the participants are understood, the participants in the center can establish its mission, goals, objectives, and structure.

## Components of the Network

Just as there are many ways to structure the network, there are also many ways to deliver information. The national P2 information network should be accessible by a variety of mechanisms. There is no one best way to deliver information on P2. The Internet is a powerful tool that is able to deliver information quickly, but many state and local programs do not have WWW access or prefer to have someone find the information for them and receive it in a hard copy format. For this, as well as other reasons, maintaining stand-alone databases, hard copy clearinghouses and telephone hotlines will continue to be important for the foreseeable future. Secondly, surveys of small businesses have found that their preferred information delivery system is hard copy or one-on-one contact (Anderson, 1996). The following sub-sections provide an overview of the information tools that should be included in the national P2 information network and recommendations for coordination.

### Web-Sites

Many federal and state P2 programs have developed web-sites that contain a great deal of information. Web-sites offer an excellent opportunity for programs to make information available to a wide audience. Once information is on the Internet, it can be easily linked to other sites, providing an excellent opportunity for coordinating and leveraging resources. Unfortunately, not all programs have the expertise or resources to create web-sites.

A valuable role of the regional information centers should be to develop web-sites that provide a central repository for all information that is developed in the region. If state and local programs within a region already have a home page that includes their most useful information, the regional "hub" should provide hot links to their sites. The regional hub could also be the home for regional listservers, project information, calendars of events and other information that the programs in the region want to access.

The national P2 site, Enviro$en$e, could serve as the 'virtual' hub for the regional, state and local sites, as well as OECA centers and other government P2 sites. Enviro$en$e is already linked to many of these programs and is currently testing a system to enable users to easily locate information from a variety of sites (the Enviro$en$e Cooperative). This pilot provides an indexing system to allow a user to search other participating sites with one interface. This new interface should increase the efficiency of searching for P2 information on the Internet and enable the regions to build sites that suit their needs. Another role Enviro$en$e could play is assisting regional centers in building, designing and implementing virtual regional centers.

### Listservers

The success of national listservers, such as P2TECH, has demonstrated the value of this tool. Listservers provide users with access to a group of people through a single e-mail address. Questions posted on a listserver often provide referrals to other people, listings of technical documents and answers to technical questions. For staff working in smaller P2 programs, these listservers have become essential information tools.

As these listservers have become more popular, the level of traffic has increased. Many participants have found that there are too many messages, and questions are frequently redundant or too basic. To be successful, the listservers should have a focused purpose to maintain ownership among the participants. Traffic should be constant but not overwhelming, and an archiving system is essential. As the national listservers become more popular and have more traffic, the P2 programs should consider developing a network of regional listservers that are connected to a national

listserver. A question would be posted first on a regional listserver and if appropriate responses are not found in the region then it could be posted to the national listserver. This would reduce traffic on the national system while maintaining the participant's capability to access a national audience.

### Computer databases

Many regional centers have developed databases that catalogue a variety of P2 resources. Specific information on the databases is contained in Appendix B. As stated above, in order to make these databases more accessible nationally, the managers of these databases must coordinate to develop a common set of standards for database structures and software platforms. A plan should also be developed for database updates and marketing.

### Clearinghouses

To address their needs for pollution prevention information, many state and regional P2 programs have established technical libraries. These libraries were conceived as tools to promote P2 by providing users with an extensive listing of technical references and hard copy materials on implementing pollution prevention. These libraries represent a great deal of the technical information transferred through the P2 assistance programs.

National funds should be directed toward strengthening these technical libraries. At the same time, these programs should be investigating the potential to use commercial services for a portion of their data collection efforts. Many of the clearinghouses were started because there was no commercial system collecting this information. Today, some information is being gathered by commercial entities. Using them could help ease the burden of data collection and cataloguing.

### Hard Copy Information Development

Many of the existing regional centers are currently developing new information packets and manuals for their members. This activity should have long-term sustained funding. The regional centers have the ability to develop information that will be useful to a broad audience. These programs have close connections to both local and national groups and therefore can be responsive to a variety of priorities. The national P2 information network can help the regional centers disseminate hard copy materials to agencies and programs outside of the region's area. This dissemination is important to avoid duplication of effort.

## Inter-regional Coordination

Inter-regional coordination (coordination between the regional centers) efforts face many of the same challenges as the regional centers. These are described at length above and include creating widely supported coordination methods and developing appropriate policies and procedures. Similar to regional coordination, inter-regional coordination is an evolving, deliberative process. The GLRPPR and the NE P2 Roundtable found that successful inter-regional coordination takes considerable time and resources. This can be a distraction for the regional centers and can take limited resources away from regional efforts. Just as the regional center must balance local, state and regional demands, an inter-regional coordinator must balance regional and national needs.

### Fostering Networking

In the initial stages, the primary focus for inter-regional coordination should be on developing relationships among the different regional centers. The groups should get to know each other, including understanding the strengths and weaknesses that each participant brings to the network. At this time there is a need for someone or some group to continue the dialogue and

interactions that have already started and to encourage participation by emerging groups who are also developing P2 information resource collections. The obvious way to achieve this is through meetings, which should take place on a regular basis, perhaps two times each year. Because travel is expensive and results in a large commitment of time, frequent conference calls are ideal substitutes for face to face meetings. Monthly conference calls would be of considerable value.

### Assisting Emerging Centers

The national coordinator should provide assistance as emerging centers grow. The facilitator should encourage centers to share experiences to help them prevent problems and adopt successes. Finally, the network should provide information on what is already available to reduce duplication of effort and offer contacts from whom advice and guidance can be obtained. Through this process the groups can form partnerships across regions that build on the capabilities of others and create trust across the regional centers.

### Evaluating Existing Resources

A more complete analysis of the existing resources, those that are being developed and those that are needed, should be conducted by a national coordinator. Also, evaluating the existing national products, such as listservers and databases, to determine whether they are being provided in formats and using mechanisms that are available to the majority of potential network users is an important activity for the network.

### Expanding the Existing Network

As demonstrated repeatedly above, there are many entities providing assistance to business besides local and state P2 programs. These groups should be invited to participate in a national P2 information network and brought into the development of the network as early as possible, providing both staff and fiscal support. There is a great opportunity for all the programs to benefit from each others' knowledge and access to industry expertise.

## Potential Models for National Coordination

As stated above, the primary role of the national coordinator is to facilitate communication and cooperation among the regional centers and various other P2 programs. The national coordinator should also facilitate the free exchange of information among centers. For example, the national coordinator would arrange for conference calls and meetings, and be responsible, with input from the regional representatives for planning agendas, for leading discussions and providing follow up. The coordinator would work with the network participants to identify other centers developing P2 information resources and encourage their participation in network activities. The coordinator and participants would coordinate the development of standards to improve the quality of the information resources. Regional centers would still have their own clearinghouse operations, regional listservers, and meetings. The national coordinator could also serve as the first point of contact to assist regional coordinators in locating information. The national coordinator could also serve as a central point of contact to create links to other agencies' assistance programs.

Representatives from the existing regional centers have identified three possible models for national coordination. These are:

- a single permanent national coordinator
- coordination by a team
- coordination by a rotating chair selected from the regional centers

Each of these models of coordination has advantages and disadvantages that should be considered in the decision as to which one is finally selected. The following sections discuss these trade-offs.

## Single Permanent National Coordinator

Under this model, one organization would agree to coordinate the network and would dedicate at least one staff member to serve as the coordinator. Each region and other participating centers would designate their representative to the network. The advantage of this model is that it clearly designates an organization with the responsibility for coordinating the regional centers to share information and work together to achieve common goals. The potential disadvantage to this model is that it creates a hierarchical structure. With a single decision-making entity, regional centers could be forced to become more responsive to national concerns, potentially taking some control away from their regional activities.

## Team Coordination

With this model the responsibilities for national coordination would fall on all or several regional centers. Decisions regarding coordination could be done through a more consensus-based process, potentially requiring the centers to devote a large amount of time to national coordination. For instance, one regional center could be responsible for national coordination on developing data standards while another center could provide national coordination on developing web-sites. In this system the coordination role would be carried out through a distributed management system.

The advantage of this approach to national coordination is that the individual projects draw on expertise available throughout the country and it provides for the greatest amount of input by all the centers. However, each project is usually funded by a variety of different federal agencies, each of which has different mandates. As a result, individual projects can be implemented with no regard for their connection to existing efforts. This can lead to a breakdown in national coordination and competition among the participating groups. Under this model, no single group is responsible for bringing the groups and participants together regularly to coordinate the achievement of the network's goals. Another disadvantage to this model is that it requires a complex and potentially time-consuming decision-making process.

## Rotating Chair

This model combines the two options discussed above. The actual coordination would be similar to the single coordinator method. However, this model differs in that the national coordination role could be rotated through the regional centers for designated periods of time. For instance in the first year Region 10 could be the national coordinator, the following year Region 9 could have that responsibility, and the role would rotate so that each regional center would at one point be responsible for national coordination. Other regional centers could be designated as leads for specific projects. This option maintains some regional flexibility but adds a coordinator to bring the centers together.

The primary disadvantages of this approach are the possible time demands on the regional center involved in coordinating the national information network, the need to bring on a different center each year and teach them the skills required to coordinate the network, and the lack of overall accountability for year-to-year network operations. Having a single regional center as the national coordinator could also lead to potential difficultly in separating the national facilitation/coordination role with that of the needs of the center. This function could divert a substantial amount of time from regional priorities and projects unless the center doing the national coordination had staff resources dedicated to this function. The experience of the NE P2 Roundtable and GLRPPR has

shown that inter-regional coordination activities take considerably more time than the participants anticipate at the outset.

There may be additional models for national coordination, but these three appear to be most appropriate for the developing network that now exists. Based on discussions among the existing regional centers, the first option of a single, permanent national coordinator would be the most readily accepted and viable. These groups believe that a central coordinator would provide more consistency and follow-up than either of the other two models. Having a single entity with a primary focus on national coordination is necessary to achieve the goals outlined herein for the national P2 information network.

## Potential Areas of Conflict

There are many opportunities to leverage resources and build on existing activities through inter-regional coordination. However, issues can arise between regional centers. Many of these can be overcome if there are clear lines of communication and decision-making. The pilot project found that there are several potential sources of conflict including a lack of adequate credit for each participants' contribution, an equitable allocation of resources, incompatibility, competition and redundancy in efforts. These are described below.

### Credit

Assistance providers typically invest substantial funds, time and intellectual capital in the development of pollution prevention information resources. These efforts must be acknowledged when they are shared at a regional or national level. All national documents, tools, case studies, bibliographies and vendor lists should credit the sources of the information. Funding sources and local/state matching funds should also be prominently recognized. This acknowledgment should be included in the text of the document, or on a special credit section of the database or web-site. Adequate credit can help ensure continued participation by contributing information providers to the P2 information network.

### Allocation of Resources

As stated above, the lack of adequate funding for a pollution prevention information network has been a serious problem. Efforts to establish such a national P2 information network must continue to concentrate on obtaining long term core funding. There are state and local resource issues to consider as well. In the Northeast and Great Lakes regions, the state and local programs have committed substantial resources to support the development of pollution prevention information tools and to participate in regional and national information sharing workgroups. State and local programs must decide what resources they can afford to commit over the long term to the regional and national networks. There must be adequate resources available to support local, state, regional and national networks to avoid a breakdown in relations over competition for funds.

### Compatibility

As described above, national and regional cooperation has frequently suffered from a lack of compatibility in data and software. It is unlikely that a national group will be able to impose data standards on all state and local programs. Ongoing discussions by the National Pollution Prevention Roundtable's Information and Technology Transfer Working Group show that some consensus can be reached on these issues. National level coordination should be able to ensure that data standardization for ASCII and the World Wide Web is broadly adopted. This can be accomplished by sharing common data structures and file transfer formats. Maintaining a high level of data

compatibility between regional programs should be a priority of a national P2 information network to maintain consistency, avoid duplication of effort and promote cooperation between partners.

### Competition Among Centers

The experience of the existing regional information centers has shown that if adequate coordination and outreach between programs are successful, undue competition should be minimal. Many of the regional clearinghouses and the other sector centers are developing areas of expertise based on local industries and the skills of their staff. The national P2 information network should encourage this trend and fund sector and process specific information development at those centers that excel in selected areas, providing that those centers broadly share the products of their efforts. Although a certain amount of competition is healthy, too much could interfere with efforts to cooperate.

### Redundancy

Redundancy and overlap of effort have been mentioned as issues several times. The national P2 information network should help programs avoid duplication and identify those areas where cooperative efforts between centers can enhance the quality of the information resources delivered to industry.

## Evaluation and Oversight of the Network

Ongoing evaluations should be a key component of the network. Every step of the way the regional, national and sector centers should be developing methods to encourage assistance programs to provide feedback to the centers. The following section provides some recommendations for evaluating the national P2 information network.

### Regional Center Evaluation

Each regional center should develop some type of regional advisory board or steering committee that is tasked with providing direction, determining regional priorities and setting policies and operating procedures for the region. The advisory board should consist of a group that represents the constituency of the regional center. At a minimum, the advisory board should have one representative from each state that it serves. Some programs already have these boards in place, including the GLRPPR and NE P2 Roundtable as described in Appendix A.

These advisory boards should be tasked with setting up procedures and metrics to determine the effectiveness of their regional network. One tool that regional centers could use is a user survey to determine how responsive the regional center is to the entities it is serving. The development of a common metric that all state programs can use to measure the use and the utility of the information from a project would be beneficial. Evaluations should include quantitative data, such as number of information requests and materials produced. There also should be interviews with users of the center, most preferably in the form of in-person interviews rather than written surveys.

Another task for the regional advisory boards is to establish direction for the regional center. This could entail determining priority industry sectors, investigating new dissemination tools, and identifying and coordinating new regional projects. These boards could also be responsible for providing input and approval for all grants proposals and projects that a regional center undertakes.

## National Coordination Evaluation

National P2 information network advisory groups should be formed to provide oversight and evaluation and assist in steering the future of the national P2 information network as described below.

## Regional Center Advisory Council

Primary evaluation of the national coordination effort should come from the regional centers through a Regional Advisory Council. The Regional Advisory Council should provide advice on the coordination and facilitation of the network. The Regional Advisory Council should include representatives from the direct clients of the national network, including the regional and sector centers. This group should provide guidance to the national coordinator, assist in the development of policies and procedures for decision-making and provide input and approval for grants and contracts. This group should also help communicate the needs of programs at the state and local level.

## National Advisory Council

The second group, a National Advisory Council, should represent the many interests that the network is serving and should include representatives of major national agencies and groups (e.g, EPA, NIST, ASTSWMO, STAPPA/ALAPCO, ECOS, ASWPCA, trade associations, and environmental organizations). The Advisory Council should represent the interests of organizations outside the technical assistance community that have a stake in accessing pollution prevention information such as vendors, manufacturers, and consultants. This group would address the overall effectiveness of the national network in meeting its goals.

# Section 5. Recommendations for the Next Steps

Building the system that has been outlined in this report could take many years. The short term priorities for developing the network include developing a stable, long-term funding source, coordinating with other agencies' P2 information efforts and investing in regional and electronic infrastructures.

## Long-term Funding Commitment

A national P2 information network and the regional information centers will not develop successfully without adequate fiscal support. There are growing numbers of information tools available on pollution prevention, but there are not enough resources devoted to coordinating and maintaining them. The groups interested in creating this network should work with federal agencies to solidify long-term funding commitments.

## Multi-Agency Cooperation

Critical to the success of a national P2 information network is the commitment and cooperation of the agencies funding the other assistance programs/groups. All agencies involved with pollution prevention, including EPA/OPPT, EPA/OECA, DOC, DOD and DOE should be providing funding for the infrastructure of this network. Obtaining this federal, multi-agency commitment to increase interactions would benefit all participants. Accomplishing this is perhaps the first and possibly the most important challenge on which the participants in the developing network should focus.

## Regional Center Infrastructure

At present, there are established or developing centers in each of the EPA regions but they are each at different development stages and have varying levels of buy-in from their constituents. Currently, the emerging regional centers require time for program development and constituency development. As described above, the developing centers have requested and benefitted from the examples of the existing centers, but they will require time to evolve more fully. The existing centers are at a stage where they are considering evaluating and possible restructuring their programs. Many of the regional centers have focused on developing coordination within their boundaries and have not devoted a great deal of time to coordination with the other regional centers. While each of these centers should form the core of the national network, they are not yet ready to function as a unified national network. In order for the network to function it must consist of fully developed regional centers that have developed coordination mechanisms with the other centers. There are also the other information centers and their relationship to regional groups is just beginning to be explored this year (1998).

Given these facts, the upcoming two years should be considered a development phase. Support should be provided to keep the discussions moving, to help the existing centers evaluate and expand their programs, to help the new centers develop more completely, and to allow the existing centers to mentor development of the emerging centers. During this period, the relationship of the regional centers with others (e.g., OECA compliance assistance centers and NIST) should be promoted. Over the next year national coordination should consist of meetings and conference calls between the regions and other centers, as well as participation by cross-region representation at other regions' meetings. These meetings should facilitate a broad-based assessment of the existing resources and develop a vision statement and strategic plan for the national network.

## Invest in Efficient Delivery Mechanisms

Internet access varies within and between regions. Investing in the infrastructure to level the playing field is critical. By doing so the coordination of the network would be greatly enhanced. The use of the Internet to locate and access information should increase rapidly in the future. However, care must be taken by all to ensure that this information is of high quality. Electronic collection and delivery offer many options including linkages that would use existing resources rather than duplicate them. The Internet can be used for rapid responses to specific problems, making it an enormously valuable tool for everyone. How to make the Internet an easy and efficient tool requires further discussion by the regional centers and other groups.

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# Appendix A
## Detailed Description of Existing Infrastructure

**Section 1. State and Local Assistance Programs**

Pollution Prevention Assistance Programs ..... A - 2
Small Business Assistance Programs (SBAP) ..... A - 3
Manufacturing Extension Partnerships ..... A - 3
Small Business Development Centers ..... A - 4

**Section 2. Regional Centers**

Existing Regional Pollution Prevention Centers ..... A - 5
New Regional Pollution Prevention Centers ..... A - 9
Emerging Regional Pollution Prevention Centers ..... A - 10

**Section 3. National Pollution Prevention Centers**

EPA Compliance Assistance Centers ..... A - 11
Alliance for Industrial Excellence ..... A - 12
National Pollution Prevention Roundtable (NPPR) ..... A - 13
American Institute for Pollution Prevention ..... A - 14

*The following section provides brief descriptions of the various programs that are developing and distributing pollution prevention information. This appendix does not include information on a number of important assistance programs that are related to pollution prevention, including the vendors of P2 equipment, consultants, local solid waste recycling programs, and pretreatment programs.*

# Section 1. State and Local Assistance Programs

The underpinnings of P2 information dissemination activities around the country are the state and local P2 agencies that provide assistance to businesses in their area. These are the programs that have daily contact with a wide variety of clients and need efficient access to accurate and timely information. The following sections provide a general overview of these types of programs. However, they vary widely, and each one has a unique structure and staff capabilities.

## Pollution Prevention Assistance Programs

All of the states now support at least one state P2 program. Nonetheless, each program is unique in its structure, functions and capabilities. Generally, states have located them in regulatory, non-regulatory environmental agencies/programs or both. There are currently two general types of state P2 programs: those with technical expertise in P2 and those who provide some form of environmental assistance in collaboration with general assistance to business (e.g., business planning, competitiveness, and compliance). Programs with P2 expertise develop materials and provide direct assistance to business. Much of the information that these P2 programs collect and publish has been designed to be used by their staff in their direct work with companies.

Many state pollution prevention assistance activities have been incorporated into various single media regulatory programs (i.e., waste management or air pollution control divisions), or they are an entirely separate program (i.e., a P2 unit within a regulatory agency or an outside agency or university). Regardless of which of these models a state has adopted, P2 programs have traditionally been associated with environmental agencies or programs. The sources of funding to support state P2 technical assistance programs vary; federal support under the Pollution Prevention Incentives for States (PPIS) grants frequently provides an important component. The services provided by these programs are diverse, but the collection and distribution of technical information are universally important activities.

The second type of state program does not have expertise in the area of pollution prevention and primarily provides businesses with other types of assistance. This category of programs includes the Small Business Administration's Small Business Development Centers (SBDC) and the Department of Commerce NIST Manufacturing Extension Partnerships (MEP). In some instances, these agencies have staff with P2 expertise who provide P2 services, but this is generally the exception rather than the rule.

The current trend in many states is to integrate the environmental assistance and general business assistance programs under a single organization or statewide network. This kind of networking and partnering is also being encouraged through federal grants, including EPA's PPIS program.

Even more varied than state programs are local P2 programs. These are generally located in larger communities with budgets to support P2 activities or in locations with strong environmental constituencies, concerns or histories. Most local programs receive financial and technical assistance from the state. Frequently, the local programs understand the benefits of P2 for small business and the community, but they may not have adequate resources to undertake ambitious projects to develop new information resources. Internet access and its use as a distribution mechanism for information on P2 is a valuable new tool for local programs that can help them quickly find answers to questions they receive from local businesses and community groups. The Internet can also help local programs identify financial and technical resources necessary for small businesses to implement P2 solutions.

## Small Business Assistance Programs (SBAP)

The Clean Air Act Amendments of 1990 required that all states develop a program to assist small businesses in meeting the requirements of the Act. Almost every state has developed a SBAP program. They provide a variety of compliance services to small businesses, including workshops, written materials, and telephone assistance, focusing on air quality control issues. In many states these programs have been incorporated into the P2 technical assistance program. In these cases, the SBAP and P2 technical assistance programs are well coordinated. In other states, the SBAP programs are located in the state's air pollution control program. In these cases, the SBAP programs may or may not coordinate their activities with the state's P2 assistance program.

EPA has established the "Federal SBAP" to provide technical assistance to these state programs. EPA's Office of Air Quality Policy and Standards (OAQPS) provides an SBAP bulletin board to help the state and EPA programs share information about their small business assistance materials and activities. The bulletin board can be accessed through the Technology Transfer Network. The federal SBAP also holds an annual national conference for the state SBAPs to facilitate information sharing and training.

## Manufacturing Extension Partnerships

A non-regulatory agency of the Commerce Department's Technology Administration, NIST promotes economic growth in the U.S. by working with industry to develop and apply technology, measurements and standards. The NIST MEP program is a growing nationwide system of state and local services and support for smaller manufacturers providing them access to new technologies, resources and expertise with the main goal of making manufacturers more competitive in the world market. The program started approximately five years ago and now has affiliate centers in all 50 states and Puerto Rico. Funding to support most affiliates in the MEP network is initially shared by federal, state and local partners. Federal support is matched by state or local funding, fees for services, and industry contributions. Unlike most state and local P2 assistance programs, which offer free technical assistance, the MEP program charges a fee for their services.

Each center tailors its services to meet the needs dictated by its location and manufacturing client base. Most extension centers offer similar services, including helping manufacturers assess their current technology and business needs, defining avenues for change and assisting with implementation of improvements. In collaboration with other organizations, many centers also assist companies with quality management, workforce training, workplace organization, business systems, marketing or financial issues. Increasingly, MEPs are adding an environmental assistance component to their assessments. Some MEP centers are beginning to promote P2 rather than pollution control.

Additionally, NIST is funding the development of tools specifically to aid MEP field agents in identifying suitable P2 options. These information tools are being provided electronically to agents in the MEP network. Training opportunities are also being offered to field agents. Both the tools and training are sector-specific and are still under development. Information on these tools is included in Appendix B.

## Small Business Development Centers

The U.S. Small Business Administration (SBA) administers the Small Business Development Center (SBDC) Program to provide management assistance to current and prospective small business owners. The program is a cooperative effort of the private sector, the educational community and federal, state and local government. SBDCs enhance economic development by providing small businesses with management and technical assistance. The centers provide counseling, training and technical assistance in small business management. SBDC services focus on assisting small businesses with financial, marketing, engineering and technical problems and feasibility studies. Special SBDC programs and economic development activities include international trade assistance, technical assistance, procurement assistance, venture capital formation and rural development. SBDC assistance is tailored to the local community and the needs of individual clients.

There are 56 SBDCs, one in every state (Texas has four), the District of Columbia, Guam, Puerto Rico and the U.S. Virgin Islands -- with a network of nearly 1,000 service locations. In each state there is a lead organization that sponsors the SBDC and manages the program. The lead organization coordinates program services offered to small businesses through a network of subcenters and satellite locations across the state. Subcenters are located at colleges, universities, community colleges, vocational schools, chambers of commerce and economic development corporations. The centers develop services in cooperation with local SBA district offices to ensure statewide coordination with other available resources.

Each center has a director, staff members, volunteers and part-time personnel. Qualified individuals recruited from professional and trade associations, the legal and banking community, academia, chambers of commerce and SCORE (the Service Corps of Retired Executives) are among those who donate their services. SBDCs also use paid consultants, consulting engineers and testing laboratories from the private sector to help clients who need specialized expertise.

At this point in time, most SBDCs do not offer P2 assistance. However, a few centers have added P2 assistance to the services they offer with support from EPA. While some of these efforts have been successful, particularly Nevada and Vermont, other states' utilization of this program to deliver P2 services have failed. Recently, several SBDCs helped to introduce federal legislation in Congress to make SBDCs the primary source for all types of federal small business assistance, including environmental and pollution prevention assistance. There is an underlying question of whether or not these programs have the expertise and desire to undertake this effort.

# Section 2. Regional Centers

## Existing Regional Pollution Prevention Centers

Starting in the late 1980's, many state and local P2 programs recognized the value of coordinating regionally. States in several regions formed regional roundtables in order to learn from and coordinate with neighboring states. Often, these programs shared similar objectives and had similar priority sectors. These regional centers have varied in terms of staff, mission and resources. They all, however, share a focus on information and technology transfer, usually starting in the form of a clearinghouse.

Currently, a framework for these regional centers exists in all of the EPA regions, however, the information services they provide and the level of coordination varies substantially. Several regional centers, those in the Northeast, Great Lakes and Southeast, span more than one EPA region.

This report describes seven existing regional information centers that are based in major geographic regions of the United States (i.e., Northeast, Southeast, Great Lakes, Midwest, Southwest, West and Northwest). The regional centers have different levels of staffing and types of services. Nonetheless, a typical center includes a regional information manager who coordinates information sharing and gathering activities. In some cases, there are also information specialists who collect, compile and catalog technical information in a variety of formats and/or topical specialists who interact directly with industry. These staff may be located in a single regional organization, or spread throughout several organizations within a region linked through cooperative agreements. The following sections present descriptions of the regional centers moving from the East to West coast.

## EPA Regions I and II: Northeast Waste Management Officials' Association

The Northeast Waste Management Officials' Association (NEWMOA) is a non-profit interstate governmental association whose membership is composed of the hazardous, solid waste and pollution prevention programs in Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont. The organization was founded in 1986. NEWMOA's mission is to help states articulate, promote and implement, economically sound regional programs for the enhancement of environmental protection. The group fulfills this mission by providing a variety of support services that facilitate communication and cooperation among member states and between the states and EPA and promote the efficient sharing of state and federal program resources. The Northeast States Pollution Prevention Roundtable is a program of NEWMOA.

NEWMOA established the Northeast States Pollution Prevention Roundtable (NE P2 Roundtable) in 1989 to enhance the capabilities of state and local environmental officials to develop and implement effective source reduction programs. The NE P2 Roundtable's program involves eight components: (1) managing a regional roundtable of state and local pollution prevention programs; (2) managing a clearinghouse of information on pollution prevention, including over 3,000 technical reports, case studies, fact sheets and books; (3) conducting training for state and local officials and industry representatives on source reduction policies, strategies and technologies; (4) researching source reduction strategies and techniques; (5) publishing a newsletter, manuals, reports, pamphlets and case studies on pollution prevention topics; (6) commenting on proposed federal programs and regulations; (7) developing regional strategies to address environmental problems; and (8) maintaining several databases. The clearinghouse provides P2 information to the public, industry and state officials. Funding for the NE P2 Roundtable is provided by the member

states and the U.S. EPA. The NE P2 Roundtable currently has a staff of five full-time employees and four part-time employees.

NEWMOA is governed by a Board of Directors comprised of the state pollution prevention, solid waste and hazardous waste program directors from the seven member states. While the Board of Directors oversees the organization, the NE P2 Roundtable is managed by a Steering Committee made up of one representative of each member state pollution prevention program. This committee is appointed by the P2 representatives on the board. This committee provides direction and oversight for the NE P2 Roundtable efforts. Members of the Steering Committee serve for two-year terms.

The NE P2 Roundtable meets three to four times per year. In recent years these two day meetings have focused on training, information and technology transfer, collaboration on regional projects, presentations on EPA initiatives and P2 efforts and sharing of P2 program developments and activities. The group publishes a newsletter on state and local P2 activities for each of these meetings. In addition, the NE P2 Roundtable sponsors various training courses separate from the regular roundtable meeting. These cover a wide variety of P2 topics, including P2 technologies for particular industries, team building for P2, new regulations, policy developments and business decision making techniques.

In order to help the local, state and EPA assistance programs in the Northeast to coordinate and build on each other efforts, the NE P2 Roundtable formed the P2 Clearinghouse Network Committee in 1991. The purpose of the group is to facilitate information exchange between the P2 clearinghouses in the region. With the assistance of the clearinghouse committee, the NE P2 Roundtable developed a compendium of case studies written by the states on P2 successes at a wide variety of companies. In addition, the NE P2 Roundtable has developed a directory of participating programs. All these efforts have been directed towards improving the ability of state and local P2 programs in the Northeast to provide their clients with accessible, high-quality P2 information.

In the fall of 1994, the NE P2 Roundtable received a three year cooperative agreement from EPA headquarters to develop a regional information distribution system that could serve as a model for other regions of the country. This cooperative agreement also provided support for the Solid and Hazardous Waste Education Center and the Waste Management and Research Center to manage a similar model program for the Great Lakes Regional P2 Roundtable (GLRPPR). In addition, the cooperative agreement supported coordination activities by the two groups. The NE P2 Roundtable has been managing this cooperative agreement and coordination for over two years.

After the NE P2 Roundtable received the EPA Headquarters support, the group focused on developing a system that would increase information sharing between pollution prevention programs in the Northeast and improve the quality of the available information. To facilitate this process the Clearinghouse Committee decided to expand its membership to include small- and medium-sized business representatives, consultants, vendors, trade associations, health departments, municipal associations, environmental groups and local government. (The Committee was also renamed the Pollution Prevention Information Dissemination Committee - P2ID). The purpose of this expanded group was to develop ideas and strategies that would enable the local, state and regional information projects to be more effective. The first project of the P2ID Committee was the development of a five-year strategic plan that provided a roadmap for a strong, efficient and effective regional P2 information network.

As a result of the strategic planning efforts, the P2ID committee directed EPA headquarters funding toward projects that the group identified as priorities. These efforts included the development of synthesized information manuals on the metal finishing and metal coatings sectors, the creation of a guide and training on accessing pollution prevention information electronically and development of a P2Experts and P2Trainer databases. In addition, the NE P2 Roundtable secured funding to support two additional model projects for the Northeast states to develop electronic information resources for printers and outreach activities and materials for auto repair facilities in environmental justice areas.

During the third year of this effort, EPA provided funding for the NE P2 Roundtable, in conjunction with Great Lakes Regional P2 Roundtable to train and support two emerging regional P2 centers. This support effort has enabled NEWMOA and GLRPPR to provide guidance and training to emerging regional roundtables in EPA Regions 6 and 9 as they begin to lay the foundations for their centers. NE P2 Roundtable staff worked directly with the states in Region 6 to assist them in the development of a regional strategic plan. This plan is another product of this effort.

## EPA Regions III and IV: Waste Reduction Resource Center (WRRC)

The WRRC was established in 1988 by a core agreement between EPA Region IV, the North Carolina Office of Waste Reduction (NCOWR) and the Tennessee Valley Authority (TVA). Current funding for WRRC is provided primarily by EPA Regions III and IV with supplemental grants and contracts from NIST and NPPR. Currently, WRRC has a staff of six full-time employees.

WRRC primarily serves the states in EPA Regions III and IV. Information is provided to companies and states both in paper and electronic formats. The WRRC uses its library of over 7,000 journal articles, case studies, technical reports and books as well as the expertise of its staff to respond to questions on industry categories, manufacturing processes, hazardous waste streams and pollutant discharges. Specific information includes economic and technical data, process descriptions, waste reduction techniques and implementation strategies. The library also contains information on municipal recycling, solid waste reduction, and environmental audits.

The WRRC engineers are available for free, non-regulatory, on-site technical assistance; to train regional and state environmental or technical assistance staff; to participate in joint state, EPA, or TVA waste audit teams; to conduct pollution prevention waste audits under the direction of EPA Region IV; and to conduct technical assistance visits to requesting industries throughout the Southeast. The Resource Center engineers prepare upon request reports and information packets identifying solutions to specific facility or waste-stream problems. The WRRC library of over 500 case study summaries is particularly valuable for these reports. Their case study summary database provides specific examples of successful waste reduction efforts and includes summaries developed by programs in EPA Regions III and IV and from other state programs and databases. Each case summary includes a general process description, production data, waste reduction techniques applied and the economic and environmental benefits. Training and workshop assistance includes program/format development, background materials and speakers/presenters.

Additional information exchange occurs through roundtable meetings for the Region III and IV states. WRRC participates in the roundtable meetings, but the coordination and hosting of the meetings is generally handled by others (this year the National Pollution Prevention Roundtable organized a meeting). This has been a useful mechanism for states to learn about each other's activities and to explore partnering opportunities. WRRC's role is to serve as the primary

mechanism for information development and distribution on pollution prevention activities in EPA Regions III and IV.

## EPA Region V: Great Lakes Regional Pollution Prevention Roundtable

In 1985 a small group of technical assistance providers in the Great Lakes Region began meeting to exchange information and later to the Great Lakes Regional Pollution Prevention Roundtable. The GLRPPR is now a formal organization with clear goals and an organizational plan. The GLRPPR supports pollution prevention through information sharing, issue discussion and program development among member organizations. Information sharing occurs through conferences, networking among members and peer organizations and the exchange of written and electronic resources on technical, regulatory or communications aspects of pollution prevention. The GLRPPR serves as a forum for discussing issues, usually through priority agenda items at its conferences. GLRPPR seeks to attract funding for itself and member organizations, to provide training for members and others and to establish regional pollution prevention resources.

Currently GLRPPR membership includes about 350 individuals representing over 160 organizations in the Great Lakes states and Ontario. The organization's participants come from state and local environmental and business development agencies, industry and trade associations, labor unions, environmental advocacy groups, nonprofit research centers, academia, technical assistance providers and federal agency programs with a Great Lakes and pollution prevention focus. Membership is free, defined by participation in GLRPPR activities, and open to individuals from the types of organizations mentioned above, and to other organizations that promote or implement pollution prevention in the region. The GLRPPR is guided by a 12-member Steering Committee designed to generally reflect the membership. Members of the Steering Committee serve staggered two year terms.

In 1994 the Roundtable membership adopted a charter that formalized the organizational structure of the GLRPPR. The intent was to provide continuity, guidance and a long term commitment to the organization's goals. Funding, from EPA Region V, currently supports a half-time Executive Director, who works with the Steering Committee to organize annual meetings, facilitate information exchange, and oversee member services. In 1996, the executive director position and oversight for member services was awarded to WMRC as the result of a competitive process.

WMRC receives funding from EPA Region V and Headquarters to support GLRPPR's clearinghouse (primarily the TECHINFO and VENDINFO databases), develop a GLRPPR home page, produce the GLRPPR newsletter (LINK), maintain the national P2TECH and P2REG listserves and their archives and maintain regional listservers for the GLRPPR membership and its workgroups.

GLRPPR's two annual meetings are designed to be an opportunity for training, technical discussions, partnership development and information sharing. The Roundtable has five workgroups: Training and Education, Regulatory Integration, Technical Assistance, Information Sharing and Local Governments. Discussions of problems and opportunities for joint projects and successful programs are part of the formal presentations and the workgroup sessions at each meeting. Discussions continue between meetings through the use of workgroup listservers where participants can report on progress that has occurred since the meeting and continue to seek input from the workgroup participants.

During the past three years, WMRC and SHWEC (representing the GLRPPR) have worked with NE P2 Roundtable to share information and resources in the pilot project described in the body of the report.

### EPA Region X: Pollution Prevention Research Center

The Pacific Northwest Pollution Prevention Resource Center (PPRC) is a nonprofit organization that was created on the recommendation of the Pacific Northwest Hazardous Waste Advisory Council, a group of representatives from industry, public interest groups, academia and other Northwest stakeholders appointed by the governors of the Northwest states to discuss hazardous waste management in the region. The PPRC was created in 1990 to help meet the region's pollution prevention challenges. Its mission is to protect public health, safety and the environment by supporting research and projects that result in pollution prevention and toxics use elimination and reduction.

Headquartered in Seattle, Washington, the PPRC is governed by a board of directors comprised of regional industry, environmental, academic and business leaders. The organization receives financial contributions from state, provincial and federal governments, foundations and prominent Northwest companies.

The organization's goals is to identify opportunities and barriers to the implementation of pollution prevention, and serve as a catalyst for progressive change; to work cooperatively with and coordinate communication among government agencies, business leaders, public interest representatives and others, in an effort to help these diverse groups share ideas and find solutions that result in pollution prevention; to disseminate information, updates, trends, challenges and success stories so that others are better able to integrate pollution prevention into their own decision-making; and to serve as a model of cooperation and coordination for the rest of North America.

The PPRC accomplishes its goals through: communication and information transfer. The PPRC works to share important and timely pollution prevention information with a variety of concerned audiences, including industry, government, environmental groups, researchers and others. By having easy access to updates, trends, challenges and success stories in pollution prevention, these groups are better able to integrate pollution prevention into their own decision-making. The PPRC also organizes and holds roundtable discussions, bringing key industry representatives, vendors, researchers, environmental groups and government agencies together to identify research needs, exchange information and identify opportunities and barriers to the implementation of pollution prevention. Once research needs are identified, the PPRC catalyzes projects that address those needs and helps the public gain access to project results. The PPRC also offers general assistance and expertise through presentations, referrals and other activities.

## New Regional Pollution Prevention Centers

State and local governments established two new center in 1996. These new centers are located in EPA Regions VI and IX. Both of these groups are beginning to develop their activities with a primary focus on serving as conduits for exchanging information using electronic distribution systems, including listservers and web-sites. Unlike the more established centers described above, the new centers are not providing access to technical expertise or documents; rather they are serving as a referral and coordinating function. The two regions are both developing Internet tools, such as regional listservers and web-sites, to facilitate coordination and transfer of information between pollution prevention programs, assistance providers and university programs.

## EPA Region VI

The EPA Region VI states have been holding regional roundtable meetings as their primary mechanism for information exchange, and are now in the process of developing a Southwest Regional Pollution Prevention Information Center to enhance this exchange. There are numerous P2 information resources in the Region VI states, and this Center is an attempt to bring them together to increase access to all who might find the resources useful and to find the most effective mechanism to continue the compilation and distribution process.

The focus of the Southwest Center has been electronic access and distribution of information. Already in development is a listserver for information exchange between technical assistance providers and a web page to provide information on resources and where they can be obtained. With assistance from the NE P2 Roundtable staff, the group is currently developing a multi-year strategic plan to establish objectives as to what is needed by the member-organizations and how they will meet those needs. The original support for the Center came from the Southwestern states and federal agencies. The Region VI Roundtable contracted with the University of Texas at El Paso to develop the tools and facilitate development of their information center.

## EPA Region IX

In 1996 EPA Region IX provided support to the Local Government Commission (LGC) to hold a meeting of regional groups involved in pollution prevention to discuss the formation of a Western States P2 Hub. This region is a complex mixture of diverse programs and regulations that are dominated by the California participants. There are multiple resources already available, and the group plans to tie them together so that all are used effectively and the participating organizations learn from each others successes and failures.

The objective of the Hub is to have a central contact for information. This Hub would direct a client to the most probable source for an answer to their problem rather than trying to provide a central source of information to address all questions. The LGC invited the NE P2 Roundtable and GLRPPR to participate in the initial meeting of the Hub to share experiences and facilitate focus group discussions on the needs of the participants and an agenda for the developing roundtable.

Representatives from all of the Region IX states participated in the meetings and made the following recommendations: 1) roundtable meetings are a useful mechanism for information exchange and should continue on a regular basis and include both formal presentations and workgroup sessions; 2) information sharing through electronic means is practical and desirable, and a listserver, web page and a regional electronic yellow pages should be provided to the group; 3) the group will continue to work with the NE P2 Roundtable and GLRPPR as the Hub evolves to share experiences; and 4) a planning workgroup should be formed to develop an organizational structure for the Hub that will meet the members needs and ensure long term viability.

# Emerging Regional Pollution Prevention Centers

## EPA Region VII

State and local programs in EPA Region VII have been relying on annual meetings and personal contacts as their primary method of information exchange. Until recently, these meetings have been pulled together by volunteers, who wished to learn more about each others successes and hopefully find solutions to problems. Recently, an EPA Pollution Prevention Incentives for States (PPIS) grant was awarded to the Pollution Prevention Institute in Kansas to coordinate roundtable meetings and prepare a newsletter. As a result of this funding, two meetings are planned for the upcoming year (1998) to provide a forum for information exchange and discussions of P2 projects in

the region. Each individual Region VII organization has developed resources and already has been involved in some coordinated activities to share these resources, particularly training and technology-related materials. A more formal consolidation of the individual resources into a central repository or database is not being considered by this group. However, electronic information exchange with businesses has been discussed. One possibility is development of a listserver where companies can anonymously pose questions and receive answers from assistance providers.

# Section 3. National Pollution Prevention Centers

## EPA Compliance Assistance Centers

EPA's Office of Enforcement and Compliance Assurance (OECA) in partnership with industry, academic institutions, environmental groups and other federal agencies has established four industry-specific compliance assistance centers. The purpose of these Centers is to improve compliance of the industries they serve by increasing their awareness of the pertinent federal regulatory requirements and by providing information and approaches on technologies to enable them to achieve compliance. Each center is designed to be a "first-stop" for small businesses and technical assistance providers seeking comprehensive, easy to understand compliance information targeted specifically to their industry. Electronic linkages through the Internet have been created between the small business centers and various assistance providers and between businesses in the sectors. The centers are also developing various information tools including plain-English guides, consolidated checklists, fact sheets and other similar information. Most importantly, these centers provide contacts for additional information or actual assistance to help companies minimize their waste.

The four existing centers are the Agriculture Compliance Assistance Center, Automotive Repair Compliance Assistance Center, National Metal Finishing Center and Printers' National Environmental Assistance Center as described below. These sectors were targeted because they are heavily populated with small business that face substantial federal regulation. OECA has proposed four other sector centers for printed wiring board manufacturing, small chemical manufacturers, municipalities and transportation.

### Agriculture Compliance Assistance Center (Ag Center)

The Ag Center relies on existing sources of information and established distribution mechanisms to help the agricultural community identify flexible, common sense ways to comply with the many environmental requirements that affect their business. The Ag Center provides information on compliance requirements, pollution prevention and technical assistance resources, technologies, costs and barriers to compliance. The Center is designed so that growers, livestock-producers, other agribusinesses and agriculture information/education providers can access its resources easily - through telephone, fax, mail and the Internet. The Ag Center's home page offers current news, compliance policies and guidelines, pollution prevention information, sources of additional information, experts and summaries of regulatory initiatives and requirements.

### Automotive Repair Compliance Assistance Center (GreenLink™)

The goal of GreenLink™ is to improve compliance in the automotive service and repair community by helping them identify flexible, common sense ways to comply with the many environmental requirements that automotive businesses are subject to on a daily basis. This Center uses a centralized multi-accessible system to provide information to its users. It offers materials on

compliance requirements, pollution prevention and technical assistance resources for use by regional and state assistance and educational programs, trade associations, individual businesses, citizens and local governments. The Center also offers a referral directory for assistance and information, a training and education calendar, multi-media checklists for inspectors and shop personnel and environmental curriculum modules for the shop owner and technicians. Information is delivered primarily electronically, although hard copy is available. The Center has a hotline and fax back service.

### National Metal Finishing Resource Center (NMFRC)

The NMFRC provides comprehensive environmental compliance, technical assistance and pollution prevention information to the metal finishing industry. The Center uses the Internet to make information accessible to a range of users, including the regulatory and technical assistance communities, in a convenient and user-friendly format. The Center provides regulatory information, interpretive guidance, performance and cost comparisons across technology options, pollution prevention case studies, technical forums, vendor information and links to local technical assistance providers, trade associations and technical societies.

### Printers' National Environmental Assistance Center (PNEAC)

PNEAC links industry, governmental and university service providers to offer the most current and complete compliance and pollution prevention information to the printing industry. The Center works with trade associations, industry experts, regulators and technical assistance providers to improve compliance and reduce wastes by developing and delivering a variety of environmental information resources. Information can be accessed through the PNEAC home page, two interactive listservers (PRINTECH and PRINTREG) and an 800 number with fax-back service. The Center also offers video conferences, focus group meetings and training packages. Its clearinghouse offers summaries of regulations, reports and manuals, checklists and other guides.

## Alliance for Industrial Excellence

To provide easy access to near-term energy efficiency resources and technologies, the Department of Energy integrated five existing Office of Industrial Technologies (OIT) program's into the Alliance for Industrial Excellence. The core programs under the Alliance include:

### Climate Wise

Industry partners are encouraged to adopt new cost-effective technologies and management practices that address energy, source, process, materials and technology problems in order to reduce greenhouse gas emissions. In cooperation with the Environmental Protection Agency, partners receive recognition for improving industrial productivity and performance and for serving as a steward of the environment.

### Industrial Assessment Centers

Small and medium sized plants are helped with no-cost energy, waste and productivity assessments and recommendations for tracking energy/waste opportunities. From 30 university-based centers across the country, professors train and lead student assessment teams. Typically, over 50 percent of the teams' recommendations are carried out by the firms.

### Inventions and Innovation

Entrepreneurs and inventors of promising technologies for achieving improved energy supply, energy efficiency and pollution reduction receive seed funding and guidance to advance a

technology beyond the concept stage to commercial success.

### Motor Challenge

Manufacturers with motor-driven applications have improved performance and reduced costs as a result of OIT's role in catalyzing the development, acceptance and distribution of industry-wide best practices and technical education.

### Industries of the Future Initiative

The Industries of the Future Initiative is based upon the facilitation of partnerships within seven materials and process industries. These seven are the most energy- and waste-intensive in the U.S. manufacturing sector; they are the Aluminum, Chemicals, Forest Products, Glass, Metal Castings, Refining and Steel industries. The Department of Energy supports each industry in defining its vision of the future and in identifying technology priorities, which inevitably include P2 concepts.

The Office of Industrial Technologies then draws upon those industry-defined needs to shape R&D programs. This research into P2 technology has been applied to important production areas in a specific industry, as well as cross-cutting or enabling technologies that are shared among multiple industries.

## National Pollution Prevention Roundtable (NPPR)

Since 1985, the NPPR has provided a national forum for promoting the development, implementation and evaluation of comprehensive pollution prevention efforts. Roundtable members number more than 550 and represent over 260 organizations. Voting members are pollution prevention professionals that represent state, local and tribal agencies. Affiliate members include representatives from private industry, nonprofit organizations, trade associations, federal agencies and academic institutions. The Roundtable's mission is to help its members work together to encourage more rapid and widespread adoption of pollution prevention as the solution to environmental challenges. It membership is dedicated to avoiding, eliminating and reducing pollution at the source. The NPPR promotes partnerships between political, industrial, commercial and scientific interest and works to increase public understanding of the benefits of pollution prevention.

The NPPR has a staff of five. It is governed by a Board of Directors consisting of one Roundtable member located in each of the ten EPA Regions and four at-large representatives. Members from state, local and tribal government programs are eligible to vote for or become a Board member. Board members serve staggered three-year terms. Funding for the Roundtable operation comes primarily from federal grants, but membership dues, meeting fees and publication revenues are also used to pay expenses. In 1995, the NPPR began administering an EPA-funded grant program to develop and test tools to implement EPA's waste minimization plan, improve pollution prevention technical assistance to hazardous waste generators, analyze cross-media impacts of hazardous waste minimization activities and create innovative multi-media approaches to waste reduction.

An important role of the NPPR is to provide its members with timely information on pollution prevention. This is achieved by annual conferences to allow direct exchange of ideas, electronic communication through listservers and a web site and print resources that include a newsletter, the P2 Yellow Pages, a guide to P2 legislation and other reports and white papers.

The National Roundtable holds two annual conferences to facilitate P2 network building, and the exchange of ideas, resources and research. They typically feature sessions on policy and regulatory developments, regulatory integration issues, innovative P2 technologies, local government P2 efforts, facility planning, agricultural P2, measurement/evaluation techniques and programs on small business assistance. During these meetings, time is allocated for workgroup sessions that allow members to become more directly involved with policy development, technology advancement and improved practices. The Roundtable workgroups include: Education, Training and Learning; Facility Planning; Information and Technology Transfer; International; ISO 14000; Local Government; Regulatory Integration; and Technology and Research.

Electronic discussion of policy questions and training opportunities is encouraged through two listservers administered by the NPPR -P2 Policy and P2Trainer. The NPPR also offers a web site housed at the Enviro$en$e web-site. Visitors can access a range of information about the roundtable and pollution prevention including a definition of P2, an overview of Federal P2 legislation and information on NPPR conferences, workgroups, partnerships and publications. The site includes all Roundtable position papers and *The Directory of Industrial Experience*.

The Roundtable initiatives raise the profile of P2 in the national discussion of environmental management, achieve improved legislative and regulatory support and obtain funding for members' programs. To support its objectives, the Roundtable has formed partnerships with national and international agencies, private sector groups and regional organizations. Some of the NPPR partners include: Environmental Protection Agency, National Institute of Standards and Technology (NIST)-Manufacturing Extension Programs (MEPs), Business Roundtable, Small Business Assistance Programs (SBAPs) and United Nations Environmental Program (UNEP).

## American Institute for Pollution Prevention

The American Institute for Pollution Prevention (AIPP) is an educational non-profit organization whose members are trade associations and professional societies working to promote pollution prevention within industry and throughout society. Current membership includes 28 organizations, with approximately an equal ratio of trade associations to professional societies.

# Appendix B
## Description of Information Tools

**Section 1. Clearinghouses**

National P2 Clearinghouses ..... B - 2
Regional Pollution Prevention Information Clearinghouses ..... B - 2

**Section 2. Electronic Resources**

Web-sites ..... B - 3
Databases ..... B - 4
Listservers ..... B - 6
Software ..... B - 7

# Section 1. Clearinghouses

## National P2 Clearinghouses

### Pollution Prevention Information Clearinghouse (PPIC)

EPA's PPIC has been operational for five years. The PPIC is dedicated to reducing or eliminating industrial pollutants through technology transfer, education and public awareness. It is a free, non-regulatory service consisting of a telephone reference and referral service to answer/refer questions on pollution prevention and to take orders for documents. The PPIC repository is a hard copy reference collection that is located in the EPA Headquarters Library in Washington, D.C. and open to the public to use and collect the free materials. Included in the collection are training materials, conference proceedings, case studies, journals and federal and state government publications. The holdings are cataloged in the bibliographic INMAGIC database.

## Regional Pollution Prevention Information Clearinghouses

To address their needs for pollution prevention information, many state and regional P2 programs have established technical libraries. These libraries were conceived as tools to promote the reduction of hazardous waste and toxic emissions by providing users with an extensive listing of technical references and hard copy materials on implementing pollution prevention. The organization of information was modeled on existing library classification systems at the Waste Reduction Resource Center; Rhode Island DEM - Pollution Prevention Program; Minnesota Technical Assistance Program - Minneapolis, MN (MnTAP); and Waste Management and Research Center - Champaign, IL (WMRC) using INMAGIC bibliographic software as the computer interface. The following sections describe the existing regional information clearinghouses.

### Great Lakes Regional Pollution Prevention Information Clearinghouse (GLRPPIC)

The Great Lakes Regional Pollution Prevention Information Clearinghouse (GLRPPIC) was established in 1991 by SHWEC with funding from the Great Lakes Protection Fund. The GLRPPIC was developed as a demonstration of the feasibility of a distributed regional clearinghouse and as an opportunity to provide Great Lakes P2 technical assistance providers with information access tools and resources. The GLRPPIC began with five regional informational sources and has grown in the last two years to nine with more being sought. Since 1996, WMRC assumed responsibility for maintaining this database. This database uses INMAGIC software.

### Northeast Pollution Prevention Clearinghouse

The Northeast Pollution Prevention Clearinghouse has been operated by NEWMOA for eight years. Open to government officials, business and the public, it serves as a resource for P2 information in the Northeast. The clearinghouse offers users access to the hard copy library at NEWMOA; databases of pollution prevention clearinghouses around the country; referrals to pollution prevention experts or other resources; information on vendors of pollution prevention equipment and access to pollution prevention training events. Holdings in the Northeast Pollution Prevention Clearinghouse are cataloged in a bibliographic INMAGIC database. The clearinghouse is also responsible for maintaining a regional INMAGIC database, called P2INFO, that catalogues over 12,000 P2 documents held in ten pollution prevention clearinghouses in the Northeast.

### Waste Reduction Resource Center (WRRC)

The WRRC Information Repository contains more than 8,000 books, journals, journal articles, newsletters, handbooks, guidance manuals, conference proceedings, videos, computer programs and other reference documents and publications concerning waste reduction technologies. A bibliography is available to download for on-screen browsing. In addition, 200 of the clearinghouse documents and pamphlets are accessible in full-text format via the Internet.

## Section 2. Electronic Resources

Technical information has traditionally been delivered by two methods, written documents or personnel contact. Many P2 programs have relied on their own document holdings or university libraries as the primary sources of information. As pollution prevention has gained currency, and as the more obvious source reduction options have been implemented, the programs need more up-to-date and specific information. With a wide variety of different organizations around the world developing P2 materials, electronic delivery systems have emerged as essential repositories and sources of information. At this time most pollution prevention programs housed in government and university programs have, or will soon have, electronic access to remote sources of pollution prevention information.

Electronic sources of pollution prevention information come in a variety of configurations. There are manually distributed databases, such as the regional INMAGIC and PRO-CITE P2 Clearinghouse, databases that provide users with access to information sources without on-line access, and there are interactive databases, such as SAGE/CAGE, that lead a user through a series of decision trees to locate information on solvents and coatings. More recently, federal, regional, state and local programs are using innovative approaches to deliver technical information in a way that maximizes the use of scarce resources and reaches as many people as possible. These methods include telephone conferencing, television broadcasts and automated fax systems. With the advent of the Internet, the electronic delivery of text through E-mail, listservers, FTP, gopher and WWW sites enables the P2 community to disseminate information more quickly and efficiently. National web sites include Enviro$en$e and the OECA compliance assistance centers, and the listservers include P2TECH and NPPR. Technical support for posting electronic information on the Internet and administering listservers has been provided by the EPA and the Great Lakes Information Network (GLIN).

### Web-sites

#### Enviro$en$e

Funded by the Environmental Protection Agency and the Strategic Environmental Research and Development Program (SERDP), Enviro$en$e allows those implementing pollution prevention programs or developing research and development projects to benefit from the experience and expertise of their peers. This free, public, integrated environmental information system is accessible through the World Wide Web and is designed to assist users in finding and implementing common sense solutions. Enviro$en$e includes a pollution prevention forum for all levels of government, researchers, industry and public interest groups. EPA has created the Enviro$en$e web page with information provided by state and regional P2 programs and other government sources.

Enviro$en$e provides pollution prevention solutions to environmental problems; shares technologies, procedures and experiences across federal agencies, other governmental organizations,

manufacturers, suppliers, researchers and others; encourages the development and demonstration of pollution prevention technologies suitable for export; and helps federal agencies attain compliance with the Right-to-Know provisions of Executive Order 12856. Enviro$en$e also contains information on training opportunities and news; current and future federal regulations, executive orders and laws; databases, initiatives and technical information on P2 and other technologies; federal agency and facility information; goals and responsibilities of federal and state agencies and other organizations; funding, grants and contracts information; and international resources.

### The Pollution Prevention Information Resource for Industry Sectors (P2IRIS)

P2IRIS is a new Internet-based process improvement tool for technical assistance providers working with electroplaters, metal painters and printers. It is designed to facilitate the identification and implementation of industry-proven techniques that achieve both manufacturing process and bottom line improvements. The system provides a walk-through of a manufacturing process featuring: descriptive text and process illustrations; material balances and flow diagrams; applicable waste reduction techniques, case studies and vendors; and links to on-line resources.

## Databases

### RFP Database

The Request for Proposals (RFP) Clearinghouse includes information on current and pending RFPs related to pollution prevention, as well as archives of all past solicitations that have appeared on the site. This database is maintained by the Pacific Northwest Pollution Prevention Resource Center. The Request for Proposals (RFP) Clearinghouse is supported by funding from EPA, the U.S. Department of Defense's Strategic Environmental Research and Development Program (SERDP), the U.S. Department of Energy (DOE) and the National Pollution Prevention Roundtable. In-kind support, including technical assistance and server space for this site, is donated by the Pacific Northwest National Laboratory.

### Research Database

The Research Projects Database provides information on P2 research activities in the United States. This database is maintained by the Pacific Northwest Pollution Prevention Resource Center. The database includes information on nearly 400 projects and continues to grow as more research is conducted. The majority of the projects included in the database are those conducted by state and federal government agencies and universities and nonprofit research institutions. Other sources of information are from local government and private industry research. Users can search records using keywords or look up projects by funding or sponsoring organization. Projects included in the database must meet the following criteria focus on pollution prevention or closely related topics, generate new information, and take place within the last five years.

The Research Projects Database is supported by funding from the EPA, SERDP, DOE, and NPPR. In-kind support, including technical assistance and server space for this site, is donated by the Pacific Northwest National Laboratory. Contributors who provide information for the regional database do so voluntarily. The support for these individuals could come from federal, state, regional or private funds.

### P2Experts

P2 Experts is a database of private sector (e.g., industry, consulting, public interest groups and academics) expertise in pollution prevention. Although P2 opportunities can be found in businesses of all sizes, most companies--especially smaller firms--lack the in-house expertise to

implement source reduction programs. In addition, a growing number of consultants, business professionals, educators and non-profit staff are available to share their P2 expertises. Through an on-line directory of private sector P2 professionals, P2 Experts provides a quick and convenient way to overcome P2 information barriers and improve the quality of P2 activities. The database is currently maintained by the Northeast P2 Roundtable. P2 Experts can be accessed via the Internet at the Enviro$en$e web-site. P2 Experts is supported under contract from the NPPR and Illinois WMRC with funding from EPA Headquarters and NIST.

## P2Trainer

The P2Trainer is designed to provide users with access to the wealth of expertise that state and local programs have in designing and conduction pollution prevention training. The intended audiences for P2Trainer are federal, state and local assistance and regulatory officials involved in organizing training sessions on pollution prevention. This database focuses on workshops that have been conducted on P2 topics for government and industry personnel, environmental groups, consultants or the general public. The database does not contain courses or curriculum for educating university and college students, which is currently covered by a database from the National Pollution Prevention Center for Higher Education.

P2Trainer will be located on NPPR's site on Enviro$en$e. The NE P2 Roundtable is developing a pilot of the database in 1997 in collaboration with NPPR's Education, Training and Learning Workgroup. The pilot of P2 Trainer is currently being funded under a grant from EPA Headquarters.

## P2 Clearinghouse Databases

Financial constraints prevent state and local programs from obtaining full collections of all relevant references on pollution prevention, regional centers began developing databases that contained basic bibliographic references. These databases enable users to become aware of references of interest and where to obtain the document. Currently, there are three regional databases P2INFO, RLIBY and TECHINFO that catalogue technical pollution prevention information and one national database, VENDINFO, that catalogues vendors of pollution prevention equipment.

## P2INFO

P2INFO is a bibliographic database that catalogues the holdings of the ten pollution prevention clearinghouses in the Northeast. The P2INFO database contains more than 12,000 entries and can be accessed using INMAGIC software.

## RLIBY Database

The RLIBY database catalogues the information held in the North Carolina Waste Reduction Resource Center. The database runs off a program called PRO-CITE. Both the software and the database can be downloaded from North Carolina's home page.

## TECHINFO

TECHINFO is a national bibliographic reference database of the GLRPPR. The database contains entries from GLRPPIC, RLIBY and P2INFO databases. The GLRPPIC and P2INFO databases are similar in structure and content. Currently, the combined TECHINFO database catalogues over 16,000 pollution prevention documents. It is distributed on Enviro$en$e and on disk.

## VENDINFO

VENDINFO is a database of vendor information that can assist users in locating vendors that sell P2 equipment. It uses INMAGIC as its platform. The VENDINFO database goes beyond simply listing equipment suppliers and the type of equipment they sell. It classifies each type of equipment by the industrial process for which that equipment can be used to reduce waste. This allows users to search for equipment information for a given process when they do not know what technology is available. VENDINFO also provides keyword searching for equipment type and a more detailed equipment description, so that users can easily find suppliers, users or references. WMRC maintains the VENDINFO database and offers it on Enviro$en$e. The effort is supported by USEPA-OPPT.

## Listservers

A listserver is an Internet e-mail software package that allows a group of participants to easily exchange information using Internet e-mail. Individuals subscribe to the listserver by sending an e-mail message to the listserver manager. Once on the listserver, participants begin participating in the dialogue in the following way.

- A member of the listserver posts a question to the list address.
- That question is then sent out to all listserver members.
- Anyone with an answer to the question, posts their response to the list.

In this way all participants in the list can follow the discussion. Listservers differ from discussion groups and bulletin boards. Each subscriber receives a copy of all the messages and must decide whether to read, save, delete or respond to them. This provides a means for insuring a constant level of participation and quick response when compared to other forums. There are a variety of national listservers that serve P2 programs. Listservers on the regional level are now becoming more prevalent.

### P2 Policy

NPPR manages a listserver discussion forum for those interested in topics related to the development of P2 policy. The goal of the listserver is to stimulate information exchange by providing a conduit for participants to discuss P2 policies, regulatory integration issues and legislative developments. Currently, the listserver provides a private, unmoderated forum for 385 subscribers.

### P2REG

P2REG is a listserver dedicated to the discussion of regulatory issues among P2 professionals. P2REG currently has 200 participants from all levels of government, business, industry and international agencies. Topics, such as ISO 14000, are covered extensively. This listserver is administered by WMRC.

### P2TECH

P2TECH is a listserver dedicated to the discussion of technical strategies for implementing pollution prevention. The goal of P2TECH is to foster information exchange by making it easy for technical assistance providers to communicate with each other in the search for solutions to the many problems they encounter while helping industry. This listserver currently has over 400 subscribers from 11 countries. Questions and responses to P2TECH are stored in an electronic archive and can be reviewed at any time. The archive is kept on a server on the Internet where it can

be used as a newsgroup for posting new messages and responses. WMRC administers this listserver.

### P2 Trainer

The National Pollution Prevention Roundtable, European Roundtable on Cleaner Technologies and Products and the National Education and Training Association have started this on-line pollution prevention discussion service. The P2TRAINER listserver is designed to encourage the exchange of information about up-to-date pollution prevention educational programs and training opportunities. The intention of P2TRAINER is to encourage the listing of educational and training curricula and upcoming seminars, workshops and meetings. Currently, there are 150 subscribers to this listserver.

### PRINTECH/PRINTREG

PNEAC has established two industry-specific listservers on printing for use by assistance providers in state and local governments, trade associations, consultants and vendors. PRINTECH focuses on technical issues regarding environmental compliance and pollution prevention for printers, offering advice on alternative solvents for cleaning, fountain solutions and inks. PRINTREG provides information on regulatory activities affecting printers, such as the development and application of rules and the enforcement of self audits. Direct access to industry experts is provided by paid industry specialists from the Graphic Arts Technical Foundation (GATF) and Printing Industries of America (PIA).

## Software

### Energy, Environment, and Manufacturing (EEM)

EEM is developing integrated tools and training to improve energy efficiency, environmental performance and manufacturing process efficiency. This tool is for the metal finishing, metal forming and screw machine industries. It offers an integrated assessment tool and training for self assessments; profiles the three industries including processes and technologies, chemical and wastes issues and impacting federal regulations; and provides case study examples of successes.

### ECO-Diagnosis

ECO Diagnosis is an environmental bench marking software tool designed to help smaller manufacturers evaluate a variety of environmental issues that could potentially impact the company. The tool can be used by MEP center staff for self-training on environmental regulations and other environmental issues their clients face. Through a self- audit/evaluation process, the tool will help companies identify and correct environmental deficiencies related to their business and provide insights on how to turn potential environmental liabilities into economic competitive advantages. The tool is PC based and can be used in all industry settings.

### P2/FINANCE

P2/FINANCE is a computerized tool designed to assist in assessing the profitability of P2 investments using a Total Cost Assessment approach. P2/Finance is now being tailored to different industries - lithographic printing, flexographic printing, metal finishing and printed wiring board. There is a user's guide that includes case studies that demonstrate the effectiveness of P2FINANCE in evaluating P2 options.

### ReTAP

ReTAP is a joint project of the Clean Washington Center and the NIST MEP. It concentrates on the identification, development and implementation of manufacturing applications

for the use of post-consumer and post-industrial materials. ReTAP provides engineering consulting services related to implementation of these tools or other recycling issues. The tools, which are PC-based are: waste diversion cost analysis spreadsheet, targeting plastics manufacturers for conversion to recycled plastics, using post-consumer high density polyethylene (HDPE) resins in blown film applications and use of secondary crumb rubber particulate in compression molded rubber products.

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